FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

Ministry of Health and Family Welfare, Government of India

STANDARD SPECIFICATIONS FOR SETTING UP OF A BASIC FOOD TESTING LABORATORY

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PREFACE

Food testing and analysis is a crucial process in determining the conformity of the food to the Food Safety and Standards Regulations. Food Testing laboratories play a major role in the analytical process of food products throughout the country. A food laboratory should have the adequate facilities, infrastructure and manpower to perform the analysis of parameters for the regulatory purposes as well as surveillance. The need for a complete model to support the laboratories to ensure the basic functionalities required is indispensable.

The document "Standard Specifications for setting up of a Basic Food Testing Laboratory" envisages the facilities, a Basic Food Analysis and Testing laboratory should have to facilitate the food quality and safety assurance system. This document comprises of the basic requirements of a laboratory set-up, organizational structure, manpower requirement with desirable qualifications, building design and layout, equipment requirement with technical specifications. personnel safety, financial autonomy to laboratories, etc. The objective of this document is to strengthen the food testing laboratory network to ensure food safety and quality assurance. These specifications will lead to the Good Laboratory Practices (GLP) and enhance the accuracy of the testing results from the laboratories. It acts as a guidance document for setting up a basic food laboratory to support the regulatory compliance system of the Food Safety and Standards Act, 2006.

Any suggestions/feedback from the stakeholders, which will contribute towards updating the document from time to time are welcome.

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LIST OF ABBREVIATIONS

Abbreviation	Expansion
AAS	Atomic Absorption Spectroscopy
AMC	Annual Maintenance Contract
ATEX	Atmosphere Exposable
AU	Absorbance Units
BSC	Biosafety Cabinet
CCTV	Close Circuit TV
CCD	Charge-coupled device
CI	Chemical Ionisation
CMC	Comprehensive Maintenance Contract
DO	Designated Officer
ECD	Electron Capture Detector
EI	Electron Ionization
FVD	Vacuum Fluorescent Display
FSO	Food Safety Officer
FSSAI	Food Safety and Standards Authority of India
FLD	Fluorescence Detector
FT-IR	Fourier Transform-Infra Red
FTL	Food testing Laboratory
FA	Food Analyst
GC	Gas Chromatography
GLP	Good Laboratory Practice
HPLC	High Performance Liquid Chromatography
HPTLC	High Performance Thin Layer Chromatography
ICP	Inductively Couple Plasma
IQ	Installation Qualification.
LC	Liquid Chromatography
LCD	Liquid Crystal Display
LED	Light-Emitting Diodes
LAN	Local Area Network
LIMS	Laboratory Information Management System
MS	Mass Spectrometry
MSDS	Material Safety Data Sheet
MRM	Multiple Reaction Monitoring

NABL	National Accreditation Board of Calibrating and Testing Laboratories
NPL	National Physical Laboratory
NMI	National Institute of Meteorology
NIST	National Institute of Standards and Technology
NPD	Nitrogen Phosphorus Detector
NTU	Nephelometric Turbidity Units
NMI	National Measurement Institute
OQ	Operational Qualification
OS	Operating System
PDA	Photo Diode array
PT	Proficiency testing
PDA	Photo Diode array
PIR	Pre-installation Requirement
PM	Preventive Maintenance
ppb	Parts per billion
ppm	Parts per million
PQ	Performance Qualification
PTFE	Polytetrafluoroethylene
PUF	Polyurethane Foam
QC	Quality Control
RI	Refractive Index
RID	Refractive Index Detector
RIU	Refractive Index Units
rpm	Revolutions per minute
RSD	Relative Standard Deviation
SRM	Single Reaction Monitoring
VOC	Volatile Organic Compounds
SI	International System of Units

Abstract

Food safety is a major concern among consumers and it starts with testing of a variety of food products in a laboratory. Food testing laboratories deploying a comprehensive range of state-of- the-art analytical techniques are a necessary and vital arm of a responsible and responsive food regulatory system, important for robust implementation and enforcement.

This is a resource document intended to help in setting up a Basic Food Analysis and Testing laboratory for regulatory purposes, which can act as the silent 'expert system' ensuring the safety and quality of food. These laboratories do not require very high-end state-of-the-art equipment, yet would fulfill testing a large number of samples for regulatory compliance as well as regular surveillance activities. The document is very comprehensive and includes different aspects of the laboratory set-up, such as planning the laboratory layout, security, educational qualification and experience of laboratory personnel, equipment required for a variety of analysis and their housing in appropriate environmental conditions, laboratory safety design and waste disposal measures. The document is not "all inclusive". It does not cover all the design situations and building design.

A good technical specification for an instrument not only give the suppliers, an opportunity to provide their best offer, but will also include any requirements that must be met in order to be 'fit for purpose'. The document with technical specifications will be useful in developing systems for the efficient and timely procurement of quality laboratory equipment.

The various criteria for selecting equipment involve the proposed use of the equipment; performance characteristics; facility and infrastructural requirements; cost; availability of reagents and consumables, and arrangements for supply of these materials; ease of operation; warranty; availability of technical support from the manufacturer; service contracts etc. Considering all of these points, the specifications of key equipment used in a Food Testing Laboratory to meet and comply with the Food Safety and Standards Rules and Regulations (2011) have been compiled. The technical specifications are generic in nature and are the minimum requirement as per the FSS Rules and Regulations 2011. For any special and specific requirement for higher sensitivity /application the technical specifications may be modified to meet the same.

1. Introduction

Food safety issues and the enhancement of health security are of growing national and international concern. Key global food safety concerns include spread of microbiological hazards, chemical food contamination and related hazards, assessment of rapidly changing technologies in food production, processing and marketing. Increasing scientific understanding of the adverse consequences of unsafe food, amplified by the rapid global transmission of information has heightened consumer awareness about food safety risks to new levels. Microbiological hazards, contaminants in the form of pesticides and heavy metals and addition of adulterants (substitution of cheaper raw materials or look alike ingredients) and antibiotics in high doses to gain a competitive economic advantage are major food safety concerns. Increased attention to safety concerns in the handling, processing and packaging of foods systems from the demand of ready to eat, ready to cook and semi-prepared foods. National standards for both domestic and export trade lay down parameters for pesticide residues, antibiotic and veterinary residues, heavy metals, mycotoxins, pathogens, and other contaminants. Therefore, a basic food analytical laboratory is the silent model 'expert system' and an imminent need for ensuring the safety and quality of food.

1.1. Food Testing Laboratories

Food testing and analysis laboratories deploying a comprehensive range of analytical techniques are required for a responsible, responsive food regulatory system to support robust implementation, surveillance and enforcement of the regulations with timely analysis of samples towards compliance to international and domestic standards, being the mission. These laboratories with adequate infrastructure, facilities, equipment, supplies, reference materials, access to calibration and maintenance, and operating under an international quality assurance programme are benchmarks of a functional food testing and analysis laboratory. An adequate number of food analysts with suitable qualifications, training, experience and integrity; management and support staff form the heart of a testing laboratory. Formal accreditation, operation of effective internal quality control procedures together with participation in laboratory proficiency testing (PT) schemes are key elements in ensuring the quality of results generated by analytical laboratories. Food testing laboratories that meet the recognized best practices of analytical competency will allow FSSAI, the regulatory agency to more expeditiously utilize laboratory data for risk assessment and management.

Although a diverse array of sophisticated analytical equipment and techniques exist for food analysis and testing, the most common food testing would include microbiological and chemical analysis. The types of analysis, which do not require the use of high-end state-of-the-art equipment, like LC-MS/MS, GC-MS/MS and ICP-MS, and can be carried out by new and upcoming food testing laboratories are listed in Figure 1. The sample quantity, type of analysis that can be done, speed of the analyses, and ease of use and competent personnel are factors that would dictate the operation of new laboratories.

General Parameters	Nutritional parameters
Moisture	Total fat
Total ash	Total protein
Acid insoluble ash	Amino acids
Water soluble/ insoluble ash	Crude/Dietary Fibre
Alkalinity of ash	Fatty acid composition
Acidity	Trans fatty Acid
Total Soluble solids	Cholesterol
Rodent hair	Vitamins
Extraneous matter	Trace elements
Uric acid	Total sugar
Drained weight	Energy value
Food additives & Contaminants	**Microbiological analysis**
Colours	Total Plate Count
Antioxidants	Coliform count
Preservatives	Aerobic plate count
Artificial sweeteners	Anaerobic count
Pesticide residues	Yeast and mold count
Heavy metals	Flat sour organisms
Mycotoxins	*Staphylococcus aureus*
Common food adulterants	*Salmonella*
Antibiotics and veterinary drug residues	*Shigella*
	Clostridium botulinum
	E. coli
	Vibrio cholera
	Listeria monocytogenes

Figure 1 Types of analyses to be carried out in a Basic Food Analysis and Testing Laboratory

The types of analyses will determine the investment and the space needed for carrying out such analyses. Proximate analysis is used for the characterization of general nutritional parameters, and the capacity to perform these analyses should be seen as the minimum requirement for every Food Testing Laboratory. Other types of analyses (contaminants, drug residues, pesticide residues, antibiotic residues, authenticity etc.,) are more specialized and need specific high-end equipment and facilities. Consequently,

these analyses require highly qualified skilled personnel with deep knowledge and expensive equipment, but also demand superior working environment to avoid contamination.

The high-quality analytical demands in a new food testing laboratories requires large investments in terms of personnel, equipment and infrastructural facilities and guarantee the independence of the laboratory and avoid conflict with commercial interests.

2. Scope and Objectives

Currently, in India, neither a comprehensive set of legislation nor standards related to laboratory design, organization of different sections, number of personnel for regulatory testing, etc are available. Shortage of space and manpower are among the crucial factors that exist in many food testing laboratories. The objective is to provide a consistent and harmonized reference for establishing food testing laboratories to progressively raise the quality of testing and safety standards of food testing laboratories.

3. Setting up a Basic Food Testing and Analysis Laboratory

The major components of a laboratory involve:

a. Selection, identifying building facilities and construction, if required for various analyses

b. Developing an organizational structure and assigning responsibilities

c. Selection of analyses to be performed

d. Selection and purchase of equipment/chemicals

e. Appointment and maintaining qualified analysts/technicians/skilled and unskilled staff

f. Establishing standard operational and working procedures.

g. Establishing a Quality Assurance system based on ISO/IEC 17025:2017 and obtain the NABL accreditation within 6 months of setting up of a basic Food Testing Laboratory

All of these issues are related to the analytical work and more specifically to the methods that the laboratory intends to conduct. The choice of methods is therefore a critical step. Therefore, an overview of the analytical process and available methods, followed by their implications for construction or selection of buildings and facilities, purchase of equipment and putting in place an organizational structure with defined responsibilities for the personnel are presented in this document.

3.1. The analytical process for regulatory compliance

The foundation of a regulatory laboratory for food analysis and testing is the analytical process. The procedures and protocols to be followed must meet the rigor and highest standard of regulatory compliance and meet international requirements.

The various stages of the analytical process shown in Figure 2 remain the same, irrespective of the size, location and infrastructure of the laboratory. This process starts with the receipt of samples from the Food safety officer (FSO)/Designated Officer (DO)/ Food Business Operator (FBO) with a request for the analyses. On receipt of the samples, security and appropriate storage of samples is initiated followed by sample preparation and analyses. The results of these tests are collated, verified and following approval from an authorized person, a final report is dispatched to the FSO/DO/FBO. It is important to ensure that the accountability, security, integrity and chain of custody of the samples are met as per Food Safety and Standards Rules and Regulations (FSSR). The laboratory must ensure the legal defensibility of analytical data produced by the laboratory in case of regulatory samples. Responsibility for maintaining all these details should be clearly defined. Sample materials stored in the laboratory for a fixed time, e.g., one month, from completion of analyses are either discarded or destroyed.

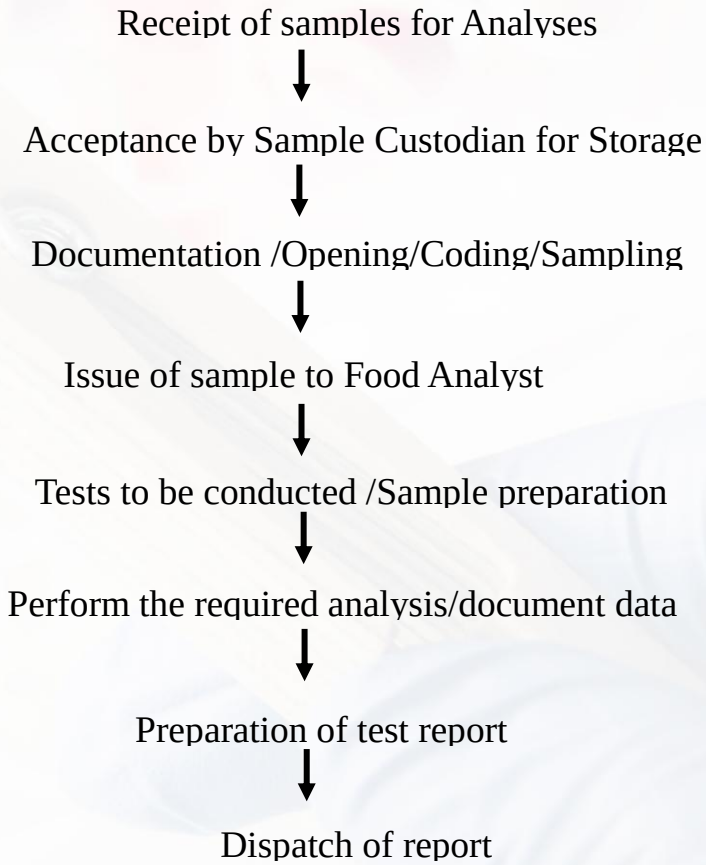


Figure 2 Various stages of the analytical process in a regulatory food analysis and testing laboratory

3.2. Specific requirements as per National Accreditation Board for Testing and Calibrating Laboratories (NABL)

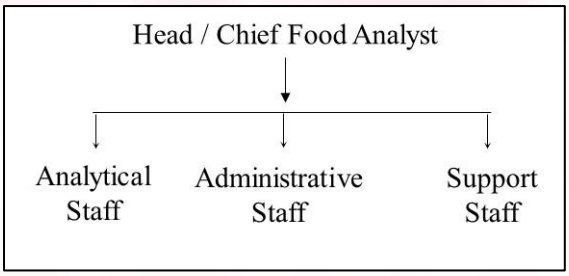
The laboratory shall ensure that measurement results are traceable to the International System of Units (SI) through:

a) Calibration provided by an NABL accredited laboratory;

b) Certified values of Certified Reference Materials (CRM) are provided by an accredited Reference Material Producer with stated metrological traceability to the SI) from NMI (such as CSIR-National Physical Laboratory, New Delhi, India)

3.3. Laboratory Organization

A skeleton structure for the Organization of a typical regulatory food analysis laboratory is as follows:



3.3.1. Analytical staff

Head/Chief Food Analyst of the Laboratory should preferably be a PhD in Science (Chemistry/ Microbiology/ Biochemistry/Food Science or related subjects) with 5-10 years hands on experience in food analysis or a qualified Food Analyst with a minimum of 15 years of experience in an established Food Testing and Analyses Laboratory. He/she should be dynamic with strong interpersonal skills, well -versed with analytical procedures (chemical and microbiological), instrumentation and quality assurance required for regulatory compliance. He/she will be responsible for laboratory safety and good house-keeping practice and ensure that the lab has necessary chemicals in required quantities in stock and functional instruments and that there are sufficient staff to attend to the workload. A key role at this position is to ensure analytical reports are reliable and have been thoroughly checked prior to their release and undertake full responsibility for the reported results. The Head of the laboratory is the spokesperson for the laboratory and should have a thorough and deep knowledge and understanding of FSSAI, FSS Rules and Regulations (2011), Quality Management Systems, documentation and procedures as per NABL requirement (ISO/IEC 17025: 2017) and other National and International rules and regulations. As per Food Safety and Standards (Recognition and Notification of Laboratories), 2018, Chief Food Analyst/ Head of the Laboratory/Authorized signatory designated by NABL will be a FSSAI qualified Food Analyst and will be responsible for implementing ISO/IEC 17025:2017 and taking care of other regulatory requirements. The

Chief Food Analyst/ Head of the Laboratory can also be designated as the Director of the Laboratory.

Senior Food Analyst: Each analytical section should preferably be headed by a Senior Food Analyst (Section manager). Desirable qualifications are M. Sc (Chemistry/ Microbiology/ Biochemistry/Food technology/Food science/), with minimum of 5 years of experience in food analysis for specific category of tests (Chemical/ Microbiological or both). It is preferable to have a FSSAI certified Food Analyst (FA). Having FAs assigned to specific units or areas of work permits the laboratory Head to effectively execute the total workload of the laboratory. The Senior Food Analyst is responsible for ensuring that daily and weekly deadlines for test results are met; quality control for each batch of testing meets requirements and is recorded; staff training is up-to-date and ensuring that proper laboratory safety and housekeeping practices are followed in the section. The Senior Food Analyst should possess the ability to optimize methods, develop standard operating procedures (SOPs) and make independent decisions on recommending procurement of additional specialized chemicals and new instruments/ equipment. He or she must be capable of answering questions and assisting in solving analytical problems posed by the individual analysts. Maintaining stocks of the necessary chemicals and consumables is also the responsibility of the Senior Food Analyst so as to enable ordering and delivery prior to stocks running low. In addition, he/she must train and prepare Junior Analysts of the section for the Food Analysts' certification exam. The Senior Food Analyst can also be designated as the Joint Director/ Deputy Director/ Assistant Director of the Laboratory

Analysts: Analytical personnel are the heart of every laboratory. They have to be reliable, precise, competent and motivated. The personnel required to perform the analyses in a food analysis laboratory can be divided into:

1. Junior Analyst: Junior analyst(s) are responsible for performing analytical work following SOPs, under the direction of the Senior Food Analyst. The essential qualification required is M.Sc. in Chemistry/Biochemistry/Analytical Chemistry/Microbiology/Food Science/Food Technology and related subjects). Post graduates who are FSSAI certified Food analysts are preferred. The analysts should have knowledge of basic chemical reactions and the principle of the methods used; be aware of laboratory safety when working with solvents, strong acids and bases; computer competency; use and handling of gas cylinders; analytical equipment like spectrophotometer; use of manuals and use of specific equipment for proximate analysis *viz*., ash, fiber, fat, protein estimation, gravimetric analysis, thin layer chromatography, paper chromatography, titration, qualitative tests for food adulterants, energy, etc. Laboratory experience is essential. Microbiological testing should be performed and supervised by an experienced person, qualified in Microbiology. Alternatively, a graduate in chemistry or microbiology with three to five years of experience in food analysis may also be considered for the post of analysts and can be trained in sample preparation and other analyses as described above. Junior Analysts should prepare and take FSSAI Food Analysts exam after working experience of three years in the laboratory.

2. Technical officers. The qualification required for Technical officers is MSc (Chemistry/ Microbiology/ Biochemistry/Food technology/Food science/Food and Nutrition/Edible oil technology/Dairy technology/Agricultural and Horticultural sciences and related subjects or BE/BTech in Food Technology/Dairy Technology/ Oil Technology and related subjects). Technical officers should be able to carry out the chemical and microbiological analysis in foods, responsible for maintenance of log books/ documents, data records and documentation of all technical activities as per the Quality manual and existing regulations.

3. Technical assistants. The qualification required for technical assistants is high school graduation (10+2) having studied Chemistry and/or Biology to carry out certain routine laboratory tasks. They can be trained in tasks, such as sample grinding, sieving/ mixing, sub sampling/media preparation/autoclaving etc. Familiarity with the use of weighing balances, pH meter, preparation of reagents with details, such as chemical names, expiry date, purity of the chemicals, etc is essential.

3.3.2. Administrative Staff

The Administrative staff includes all the administrative assistance, such as General administration, Finance & Accounts, Stores and Purchase, Secretary, typing and filing etc. These staff are generally involved in "office" or "paperwork" functions, such as looking after the office, Finance and purchase/ stores procedures and maintaining the records of samples, preparation of test reports, maintenance of accounts, etc. and general welfare of the employees. Lack of sufficient administrative staff often results in delay in reporting of the results by the analytical staff. The Secretary/Assistant for the laboratory generally works directly under the control of the Head of the Laboratory. Qualification: Any recognized Bachelor’s degree with computer knowledge and knowledge about the use of relevant software, tender preparation, Laboratory Information Management System (LIMS), TALLY etc and any specific experience commensurate to the field

3.3.3. Support Staff

Operational Head (Instrumentation) will be responsible for the upkeep and optimal functioning of specific equipment and operating methods, especially trouble-shooting, maintenance and solving problems, as well as continuous training of junior staff when required. Training records for the staff should be regularly maintained.

Technician(s) for instrument and general maintenance shall have Diploma in Electronics or Electrical or Instrumentation Engineering with two years of experience in the operation and maintenance of state-of -the-art equipment. Alternatively, a graduate in Instrumentation Engineering may also be considered.

Laboratory attendants: are all those persons working in and for the laboratory but not conducting analyses or are not involved in the administrative duties. Usually, there are no prescribed educational qualifications for this post but they must be literate and able to

read and write with the ability to support the Food Analyst/Chemist/ Technical Officers through glassware washing, cleaning & housekeeping, sterilization, disposal of sample reserves (when no longer required), pest control and other laboratory activities. It is most important that sufficient number of persons is hired for the support function. About, 15-20% of the total number of analytical staff or one per lab/ section is often sufficient.

The number of personnel and their educational and experience levels depends on the analyses to be conducted, methods chosen and the expected sample throughput. The analysis of enforcement and surveillance food samples can be carried out analytical parameter wise (Figure 1). A detailed typical organizational structure (indicative) is shown in Figure 3. Essential staff needs to be deployed by the respective Government departments; however, the support staff and the desirable staff may be outsourced.

3.4. Manpower requirements for a basic Food Analysis and Testing Laboratory in a Government set up (indicative list).

The manpower listed in Table 1 is ideally required for a government laboratory to carry out the analyses of about 500 samples per month. The analyses include: general and proximate compositional analysis, nutritional analysis, heavy metal analysis, pesticide residue analysis and microbiological examination. Individual laboratories may decide on the number of Assistant Directors, Technical Officers and support staff based on their scope of testing and available facilities**.**

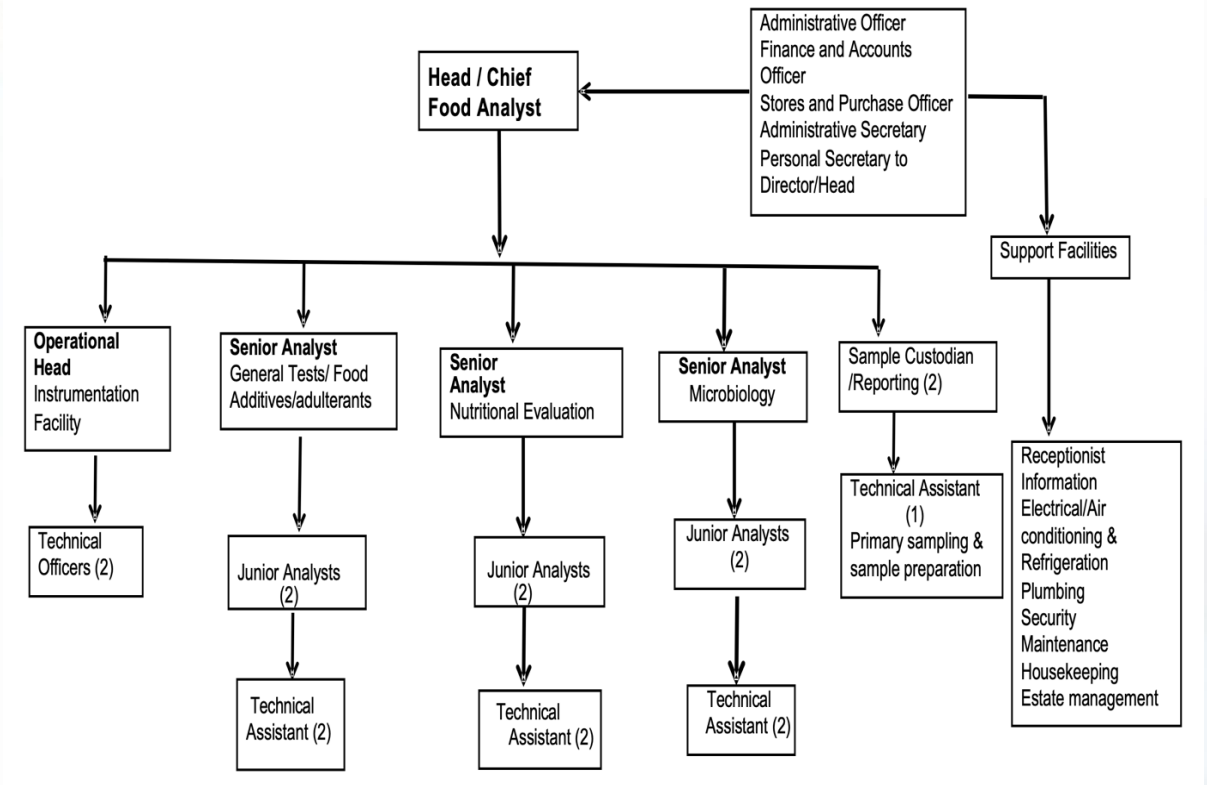


Figure 3. A typical organization charts for a Basic Food Analysis and Testing laboratory

Table 1. An indicative list of the manpower for a food laboratory analyzing ~500 samples per month in a Food Testing Laboratory is given below

S. No.	Position	Numbers required
1.	Director	1 (Essential)
2.	Joint Director/Deputy Director	1 (Essential)
3.	Assistant Director (Technical)	4 (Essential)
4.	Food Analysts	2 (Essential) with 1 having background in Microbiology
5.	Technical Officers	10 (Essential) with at least two having background in Microbiology
Administrative and Accounts Staff		
6.	Administrative Officer	1 (Essential)
7.	Accountant	1 (Essential)
8.	Personal Secretary	1 (Desirable)
9.	Office Assistants/ Executives	4 (Desirable)
Support Staff		
10.	Laboratory Assistants	2 (Essential),2 (Desirable)
11.	Technical Assistant (Electronics)	1 (Desirable)
12.	Technical Assistant (Electrical)	1 (Essential)
13.	Laboratory Attendants	2 (Essential),3 (Desirable)
14.	Multitasking Staff (MTS)	3 (Desirable)
	Total	**41, 27 (Essential), 14 (Desirable)**

The Designations mentioned above may be different for different laboratories but the functional responsibilities of the officers and staff and their qualification and experience will by and large remain similar.

3.5. Quality Control (QC) Section (optional)

The goal of the food analysis laboratory is to guarantee the generation of accurate and reliable analytical results. Having an optional QC section minimizes the reporting of erroneous results and prevents excessive repetition of analytical runs. Quality control is designed to detect deficiencies in the laboratory's internal analytical processes and ensure

that the samples are representative and data are reliable and reproducible prior to the release of results. QC samples are samples chosen randomly and the testing process is carried by analysts in the QC section using the established methods and operating conditions. The purpose of including analysis of samples by the QC section is to evaluate the reliability of lab results. The analysts of the QC division play an important part in assuring the quality and consistency of the laboratory tests.

4. Laboratory Building Requirements and Design

4.1. General requirements

The laboratory should be located in an area with some basic facilities, including good infrastructure, good access (road system) with assured potable water and uninterrupted power supply. The regulatory laboratory should be secure to provide for confidentiality and be accessed only by the authorized personnel. The use of chemicals and other potentially hazardous compounds separates a laboratory from other types of building spaces. Primarily, the laboratory must provide a safe and healthy working environment which complies with current thinking on comfort, energy efficiency, energy conservation and impact on the environment. It should be adequately equipped with essential services and utilities, good ventilation with fume extraction where needed, adequate lighting, safety systems, such as fire control measures, secure and protected storage for records, including computer back-up and water and gas supplies. Adequate arrangements for different types of testing must be addressed by a combination of management practices and physical segregation. All health and safety hazards must be identified and carefully evaluated so that protective measures can be incorporated into the design.

4.2. Laboratory Building and Facilities

4.2.1. Laboratory Layout

The laboratory is generally designed on the basis of the analysis to be carried out and the methods to be used, keeping in mind future analytical requirements and expansions. Laboratories must have separate zones/rooms, depending on types of analysis and functionality. The separation of laboratory space to perform various activities is primarily required to avoid cross- contamination with undesirable substances and to maximize the use of space.

Such demarcation would include but are not limited to: sample receipt and storage conducted in designated areas; wet chemistry laboratories/sections are separated from the microbiology laboratories/sections; separate storage for standards and reference materials and cultures, media preparation and sterilization in microbiology labs are separated from work areas. Primary sample preparation involves grinding, sieving, which produces dust and noise, and should be physically separated from other activities. Gravimetric analysis involves weighing, drying and incineration, which are mostly linked to each other and do not involve working with chemicals.

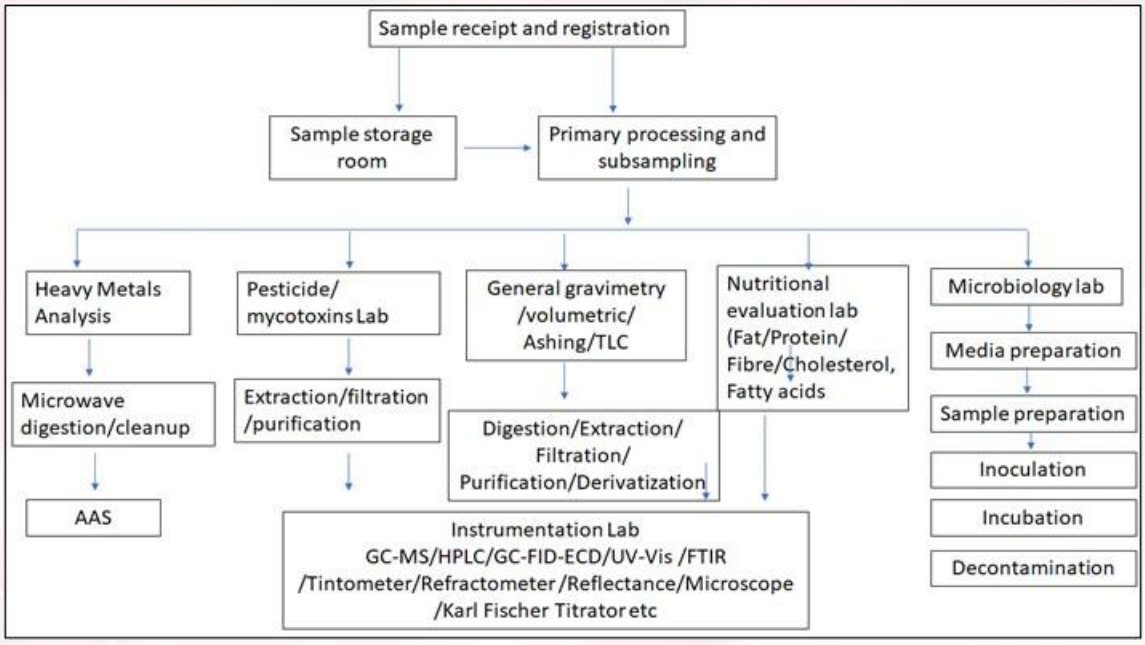


Figure 4: Schematic representation of laboratory sections of a food analysis laboratory

Traditionally, wet chemistry labs and sample preparation for contaminants/mycotoxins are physically separated to avoid cross contamination. Mixing of flammable solvents and corrosive chemicals is a chemical hazard and such operations are carried out in separate sections, for e.g., microwave digestion with acids prior to Atomic Absorption Spectroscopy (AAS) and extraction of pesticides with organic solvents and clean-up prior to analyses using Gas Chromatography. Instruments, such as High Performance Liquid Chromatography (HPLC), GC with Flame ionization detector (FID)/Electron Capture Detector (ECD) etc. are placed in a dust-free room, which has provision to maintain and control humidity and temperature. A small dark room may be included in the instrumentation room for analysis of aflatoxins. If mycotoxin is to be analyzed, there will be a requirement for a biological safety cabinet in the laboratory. The layout for a microbiology laboratory involves a unidirectional flow of events with suitable air handling units. The restrooms and rooms where food and beverage are consumed should not be in a close proximity to the Microbiology lab. Figure 4 shows a schematic presentation of different sections of a food analysis laboratory. In order to achieve maximum efficiency, laboratory activities should be separated into different sections, each with different requirements as elaborated below.

4.2.1.1. Sample receipt and registration

An area which is convenient for courier personnel/postman/delivery personnel to deliver samples. Most often, this room is at the entrance of the laboratory. Sample should be received through a large window and all the communications should be carried out through this route. Here the samples are logged into a booking system, which is either done manually in a register or using LIMS or relevant software. The sample is given a

unique identification number by the laboratory. The requested analysis by the FSO is logged in the sample register. The sample parcel is opened under CCTV surveillance. All information about the sample package including number of seals, packing material, etc. is recorded and then passed on to the primary sample processing and sub-sampling section. If the analysis cannot be processed, it is stored under appropriate conditions.

Area	ca 50 sq. m with a large window with access control for authorised personnel
Equipment and related item	Computer and printer with Local Area Network (LAN) CCTV surveillance
Furniture	Office tables and chairs Secured sample storage facilities Refrigerator (8-10 °C), Upright freezer (-25 to-20 °C)
Safety	Fire extinguisher Hand washing facility First aid kit Segregated waste disposal containers

4.2.1.2. Sample storage room

Storage of the sample must not alter the sample in any significant way – whether through contamination, loss, deterioration or any other means. Physical security of sample prevents intentional adulteration and alteration of the sample. Hence entry to the storage area should be restricted to the authorized personnel. Maintenance of proper storage temperatures is required to maintain the integrity of the sample/analyte to be analyzed. The room should be under CCTV surveillance.

Area	ca 50 sq m with access control for authorised personnel Air-conditioned temperature 20± 2 °C RH 50-70%
Equipment and related items	Computer and printer with Local Area Network (LAN) CCTV surveillance Secured sample storage facilities Refrigerator (8-10 °C), Upright freezer (-25 to-20 °C)
Furniture	Office tables and chairs Storage possibilities, such as shelves and cupboards/almirah for sample material
Safety	Fire extinguisher First aid kit Segregated waste disposal containers

4.2.1.3. Primary sample processing and sub sampling preparation

The analytical samples are prepared by grinding the laboratory sample. Homogeneity of samples is achieved with grinding in mills, homogenizers, coffee grinders, or a suitable equivalent device, depending on the size and the structure of the laboratory sample. In case, where the laboratory sample is flour or liquid, homogenization is not needed, but mixing or shaking may still be required. This section must have an independent room inter connected to the sample receipt room, where sub-sampling, blending, grinding and, if necessary, pre-drying can be performed. If necessary, an air extraction unit can be utilized to remove odour as well as excess heat. Grinding will produce noise and dust, therefore safety precautions like wearing masks/ear plugs/muffs should be made compulsory for these operations.

Area	ca 50 sq m
Equipment and related items	Computer and printer with Local Area Network (LAN) CCTV surveillance Grinding mill/Waring Blender with jars and sieves Brushes for cleaning sieves and grinder Cubicles connected to a ventilation system for grinding Sample splitter Drying oven Top pan balance Secured sample storage facilities Refrigerator (8-10 °C), Upright freezer (-25 to-20 °C)
Furniture	Work table with sink/bench, chairs
Safety equipment/protection	Dust masks/Lab coats Safety glasses and ear protection Eyewash Safety shower Hand washing facilities Fire extinguisher First aid kit Segregated waste disposal containers

4.2.1.4. Wet Chemistry Laboratory

Digestion, filtration, distillation, titration, extraction, derivatization and dilution are all unit operations in a typical food analysis laboratory. Independent laboratory rooms can be provided for independent activities as shown in Figure 4. In each laboratory, a separate area must be designated for acid use and storage. A separate area for flammable solvent

use and storage must be identified for these laboratories. This area requires access to water and should be close to glassware supplies, balances, fume hood and chemical supplies. Laboratory space must be arranged for maximum utilization as well as proper work flow. It is usual to allow about 10 square meters of laboratory space and 3 meters of bench surface per analyst.

Room 1 Proximate and General analysis	
Area	ca 60 sq m
*Equipment and related items	Weighing balance (0.1 and 0.001 g) Auto titrators Muffle Furnace Hot air ovens (110-130 °C) Refrigerator (8-10 °C Water bath Hotplates Freezer (-20-25 -20°C) Fume hoods connected to an exhaust system Water and gas supply Vacuum facilities Network connection or Computer and accessories
Furniture	Work table with sink/bench, chairs Safety cabinets for storage of chemical solutions (acids & bases, flammable solvents to be stored separately) and chemicals Glassware storage cabinets for beakers, crucibles, dispensers, pipettes and measuring cylinders etc
Safety equipment/ protection	Dust masks/Lab coats Safety glasses and ear protection Eyewash Safety shower Hand washing facilities Fire extinguisher First aid kit Solvent cabinets Chemical spill kits Segregated waste disposal containers for broken glass, chemical waste, plasticware, paper. Computer waste/batteries etc
*Indicative list can vary with the test being performed. Equipment from the attached list mentioned in Annexure-I as required for the test can be procured	

Room 2 Nutritional evaluation	
Area	ca 60 sq m
*Equipment and related items	Weighing balance (0.1 and 0.001 g Auto titrators Filtration unit pH meter Soxhlet Fat extractor Automated Protein digestor and titrator for Kjeldhal Nitrogen Reflux system Acid concentrator Rotary evaporator Fibre and fat analyser Centrifuges Incubator shakers Hot air ovens (110-130 °C) Refrigerator Water purification system Vortex mixer Ultrasonic bath Water bath Hotplates Freezer Fume hoods connected to an exhaust system Water and gas supply Vacuum facilities Network connection or Computer and
Furniture	Work table with sink/bench, chairs Safety cabinets for storage of chemical solutions (acids & bases, flammable solvents to be stored separately) and chemicals Glassware storage cabinets for beakers, crucibles, dispensers, pipettes and measuring cylinders etc
Safety equipment/ protection	Dust masks/Lab coats Safety glasses and ear protection Eyewash Safety shower Hand washing facilities Fire extinguisher

	First aid kit Solvent cabinets Chemical spill kits Segregated waste disposal containers for broken glass, chemical waste, plasticware, paper. Computer waste/batteries etc
*Indicative list can vary with the tests being performed. Equipment from the list (Annexure I) as required for the test can be procured	

Room 3 Wet Lab for pesticide residues/mycotoxin sample preparation	
Area	ca 40 sq m
*Equipment and related items	Weighing balance (0.1 and 0.001 g) Solvent Filtration unit pH meter Nitrogen evaporator Rotary evaporator Centrifuges Incubator shakers Refrigerator Water purification system Vortex mixer Ultrasonic bath Water bath Solid phase extraction unit Freezer (-25 to-20 °C) Fume hoods connected to an exhaust system Water and gas supply Vacuum manifold Network connection or Computer and accessories
Furniture	Work table with sink/bench, chairs Safety cabinets for storage of chemical solutions (acids & bases, flammable solvents to be stored separately) and chemicals Glassware storage cabinets for beakers, crucibles, dispensers, pipettes and measuring cylinders etc
Safety equipment/ protection	Dust masks/Lab coats Safety glasses and ear protection Eyewash

	Safety shower Hand washing facilities Fire extinguisher First aid kit Solvent cabinets Chemical spill kits Segregated waste disposal containers for broken glass, chemical waste, plasticware, paper. Computer waste/batteries etc
*Indicative list can vary with the tests being performed	

Room-4 Instrumentation room	
Area	ca 100-120 sq m Temperature (20±3 °C) and Humidity controlled (50-70%RH)
*Equipment and related items	Gas Chromatograph with FID /ECD/NPD detector HPLC with RI, Fluorescence and Photodiode array detector (PDA) UPLC with binary solvent system and detectors Tintometer/Reflectance spectrometer Karl Fischer Titration Unit UV-Visible Spectrophotometer Elemental-analyser Microscope Fluorescence spectrometer Nitrogen/hydrogen generator Gas purifying panels and systems Uninterrupted power supply Water and gas supply Air conditioners *Cassette type) Purified water system for chromatography work Thermohygrometer Network connections to allow direct laboratory access to data generated from the equipment connection or Computer and accessories
Furniture	Instrument table (vibration free) with chairs Safety cabinets for storage of Manuals and records
Safety equipment/ protection	Lab coats Dedicated footwear

	Safety glasses/goggles Eyewash Safety shower Hand washing facilities Fire extinguisher First aid kit Solvent cabinets Chemical spill kits Segregated waste disposal containers for broken glass, chemical waste, plastic ware, paper. Computer waste/batteries etc
*Indicative list can vary with the test being performed Annexure I provides a list of equipment required for food testing labs and the required instruments can be installed as per the scope of testing of parameters	

Room-5 Heavy Metal Analysis (a suite of two rooms side by side) using AAS	
Area	ca 30 sq m for housing AAS or ICP-MS ca 15 sq m for sample preparation room
Room and environment requirements	Dust Free Controlled Temperature (20±3 °C) Short-term variations must be at a maximum rate of change of 3 °C per hour Advisable to have two air conditioners so that each can run for 24×7 & alternatively. The relative humidity should be between 20 and 80%. Temperature and hygrometer to record temperature and humidity. A sturdy table with space at the rear and sides of the system for air to circulate freely. A cart or table close to the AAS for flame auto samplers, sinks, hand wash facilities in sample preparation rooms A venting system for removing the combustion fumes and vapors from the flame or graphite furnace. The flow rate of venting system should be approximately 7000-8500 L/min Provide space for air circulation, gas lines & electrical connections (24” behind the system). Dissipate room heat and allow for routine maintenance (at least 3 feet above the system Graphite furnaces require electrical power, cooling water and a supply of inert gas, normally argon

	Uninterrupted power supply Water and gas supply
Equipment	AAS with all accessories Microwave digester and Clean-bench for AAS sample preparation room Fume Hood in sample preparation room Refrigerator for storing standards and reference material Freezer Analytical balance (0.0001 mg)
Furniture	Instrument table (vibration free) with chairs Cabinets for storage of Manuals and records
Power supply	Main's voltage fluctuations must not exceed ±10%. A measured ground to neutral potential of greater than 3 volts ac or dc indicates grounding problems that will need correction. The power supply boards with sockets must be located within 2 m (6.5 ft.) of the instrument It is recommended that time delay fuses and circuit-breakers are used to prevent nuisance tripping Additional protection to be provided for the instrument by means of Ground Fault Circuit Interrupters
Gas requirements	*Compressed Air*: For flame operation, the air supply should provide a minimum of `28-30 L/min at a minimum pressure of 350 kPa. *Acetylene:* For majority of analyses, acetylene is the preferred fuel gas. Air-acetylene is the preferred flame for the determination of about 35 elements by atomic absorption. Minimum purity specification is 99.6%. Acetylene tanks should always be stored and operated in a vertical position, rather than horizontally. *Nitrous oxide*: 99.0% minimum purity. A dual-stage regulator is mandatory. *Argon:* required for external and internal gas streams. The argon must be dry, high purity (≥ 99.996%, Oxygen content ≤ 5 ppm, Nitrogen ≤ 20 ppm and water ≤ 4 ppm, and regulated), using a two-stage high purity gas regulator with stainless steel diaphragm Gas lines: the appropriate gas lines, regulators, connectors and valves to which the hoses are connected must be provide

Safety equipment/ protection	Lab coats Dedicated footwear Safety glasses/goggles Eyewash Safety shower Hand washing facilities Fire extinguisher First aid kit Facility to fasten gas cylinders Solvent cabinets Chemical spill kits Segregated waste disposal containers for broken glass, chemical waste, plasticware, paper. Computer waste/batteries etc

Room 6 Glassware washing and drying area	
Area	ca 30 sq m
*Equipment and related items	Hot-air oven (110 °C) Drying cabinets (50-60 °C) Automated Glassware washer
Furniture and related items	Water supply and rodent free drainage system Tiled floor and walls Work table and bench Storage facilities for washed and dried glassware Separate waste disposal containers for broken glass, plastic ware, paper etc
Safety equipment/ protection	Lab coats Safety glasses/goggles Eyewash First aid kit Segregated waste disposal containers for broken glass, chemical waste, plasticware, paper etc

An example of a single laboratory room for analysts and layout for instrument room with mandatory space between work tables and analysts is shown in is Figure 5A&B. The schematic layout for a complete laboratory setup is shown Figure 5C.

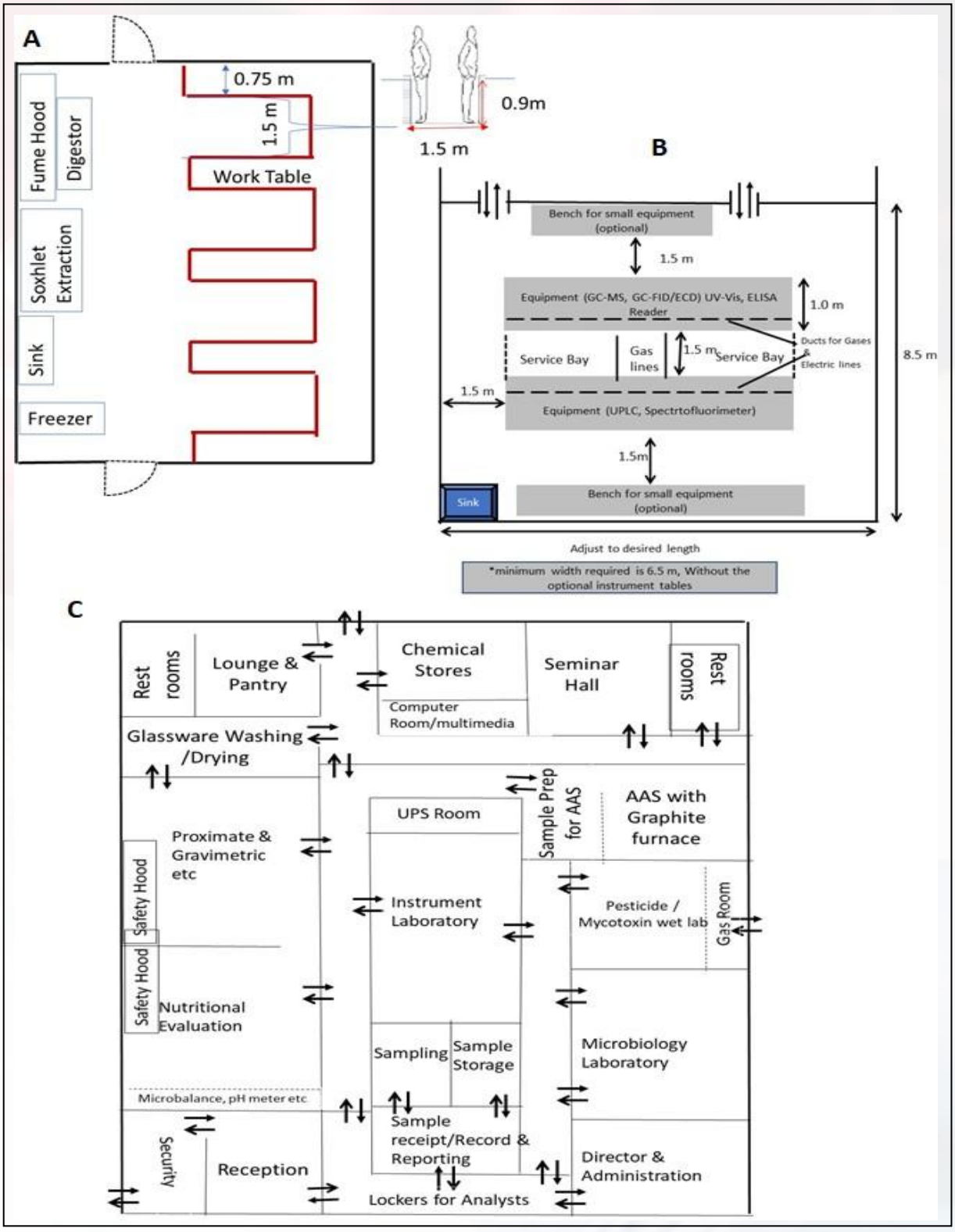


Figure 5 Schematic layout for A) laboratory for eight analysts B) Instrument room and C) Complete Food Testing Laboratory

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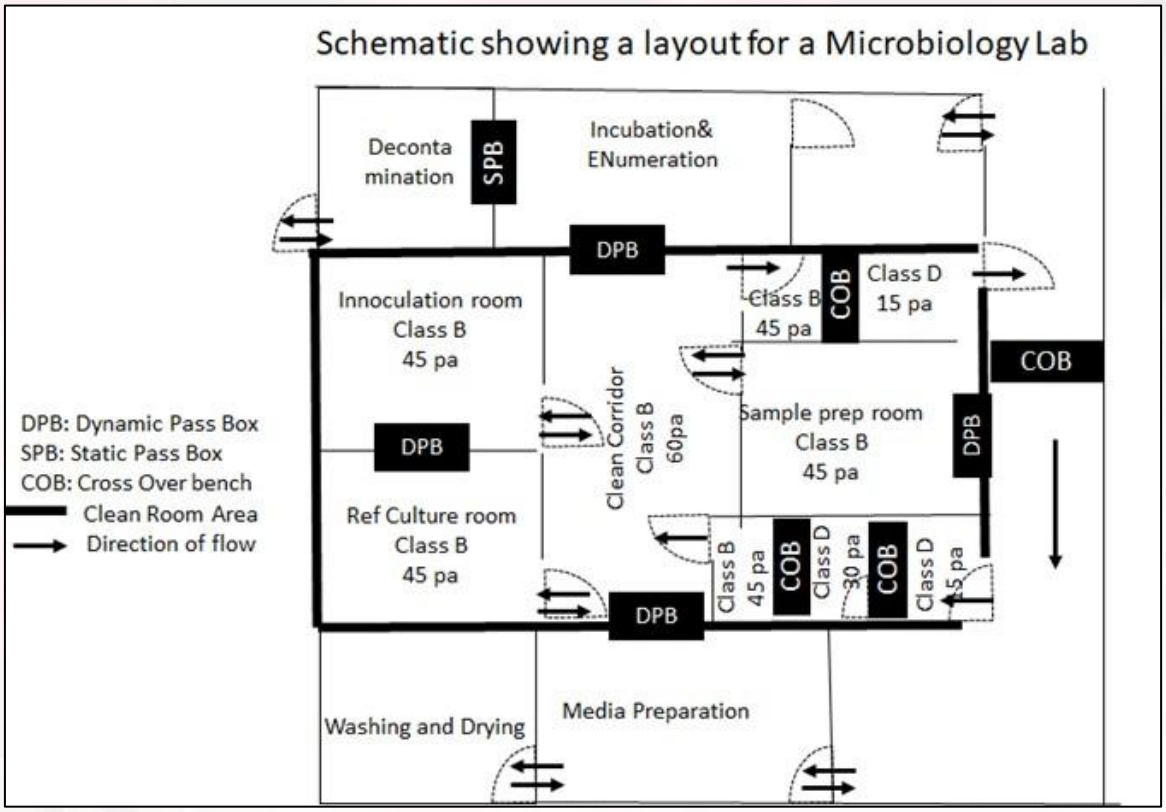

Figure 6 A schematic layout for the Microbiology section of a food laboratory

4.2.2. Microbiology Laboratory

The Microbiology laboratory and support equipment (e.g., Autoclaves, Laminar Air Flow, Biosafety cabinet etc., and glassware) should be dedicated and physically separated from other areas. There should be adequate suitable space with separate storage locations for e.g., biological indicators, reference cultures and media etc. The lab should be away from the restrooms to prevent cross contamination. The air supply to the microbiology laboratory should be through separate air-handling units and other provisions. Temperature and humidity must be maintained. The quality of the air supplied to the laboratory should be as per the ISO specifications and not be a source of contamination. Laboratory equipment used in the microbiology laboratory should not be used outside the defined microbiology area/space.

Access to the microbiological laboratory should be restricted to the authorized personnel (Biometric or use of card readers). Personnel should follow

a) the appropriate entry and exit procedures including gowning

b) the intended use of a clean rooms and corridors

c) the restrictions imposed when working in such areas

d) Use the appropriate containment level biosafety (e.g BSL-2 for *Clostridium botulinum)*

e) Use back-fastening laboratory gowns or coats

4.2.2.1. Microbiology Lab Layout

a) If entry to the laboratory is *via* a lobby, there should be some means of safeguarding the pressure differential between the laboratory and the lobby

b) Operations should be carried out preferably in the following zones

Working zone	Installation grade	Maximum number of cfu in the environment
Sample Receipt	Unclassified	Not Applicable
Media Preparation room	Grade D	<200 cfu/m^2
Sample preparation room	Grade B	<50 cfu/m^2
Inoculation room	Grade B	<50 cfu/m^2
Reference culture room	Grade B	<50 cfu/m^2
Incubation and Enumeration Room	Grade D	<200 cfu/m^2
Decontamination room	Grade D	<200 cfu/m^2

c) A change room should provide lockers to store street clothing, storage shelves for laboratory clothing

d) Floors should be smooth, slip resistant and seamless

e) Coving should be provided on the interface between the walls and the floor

f) There should be a documented cleaning and disinfection programme.

g) There should be a procedure for dealing with spillages.

h) Entry to the clean room should be *via* a system of airlocks and change room where operators are required to wear suitable clean-room garments.

i) The final change room should be of the same grade as the room it serves.

j) Change rooms should be of adequate size for ease of changing.

k) There should be clear demarcation of the different zones.

l) Adequate hand-washing and hand sanitization facilities should be available

m) A wash-hand basin(s) should be located near to the exit of the laboratory.

n) Appropriate waste disposal containers in each section must be provided

4.2.2.2. Equipment for microbiology laboratory

Dedicated equipment should be available in each of the clean areas. They should not be moved around. Pass boxes must be used to move the sample from one clean area to another. An indicative list of the instruments is provided in Annexure I.

4.2.3. Administration or office area

Area	ca 20 sq. m each for General administration, Finance and Stores and Purchase
Facilities	Computers and Printers, Local Area Network Air conditioning unit Scanner Photocopier Paper shredder Fax Phone
Furniture and related items	Work tables, including chairs Filing cabinets Storage facilities for archiving test reports Waste disposal container

4.2.4. Chemical and Supplies

Storage of the chemical and supplies must be easily accessible to the laboratory area. The store is a secure area, hence entry to the stores should be restricted to authorized personnel. Maintenance of proper storage temperatures is required to maintain the integrity of the chemicals. The room should under CCTV surveillance. An indicative list of chemicals, solvents, general equipment and microbiology media required for a Basic Functional Food Testing Laboratory is provided in Annexure II-V. **A waste disposal area must be identified depending on the available area**.

Chemical and Supplies Storage	
Area	ca 50 sq m with access control for authorised personnel only Air-conditioned temperature 20± 2 °C, RH of 50-70% Completely vented to remove toxic fumes
Facilities	Computers and Printers, Local Area Network Air conditioning units

	Scanner Photocopier Paper shredders Fax Phone
Equipment and related items	Frost free refrigerator Upright freezer (-20 to – 25 °C) Storage racks CCTV surveillance
Furniture and related items	Storage possibilities, such as shelves and cupboards for sample material Specialised storage cabinets for acids, bases, flammable solvents, oxidisers etc., Work tables, including chairs Filing cabinets
Safety equipment	Fire extinguisher Gloves Lab coats Safety Glasses and goggles Sink with eyewash Safety shower Spill kits First aid kits Emergency phone Segregated waste disposal containers for broken glass, chemical waste, plasticware, paper etc

4.2.5. Overall Space Utilization Guidelines

The design of a laboratory should conform to the following principles:

a) The laboratory area should include or have access to all the support spaces required, such as instrument and preparation labs, laboratory stores, sample stores, chemical stores, washing area, media preparation rooms, sterilization facilities, waste storage and waste treatment facilities.

b) Administration and office accommodation should not be within the laboratory working area but should ideally be in close proximity to the laboratories they serve.

c) Access to offices or other non-laboratory areas (lounge, seminar hall, restrooms) should not require going through laboratory spaces

d) Documentation areas are permitted within the working area of the laboratory; however, these should be separated from areas where hazardous materials are stored or processes are undertaken.

e) Documentation area should not be located right opposite to the fume cupboard or biological safety cabinet, but should be located near the exit.

f) A laboratory area should contain the microbiological, chemical, radiological or physical hazards sections with proper demarcation as far as possible.

g) Sufficient floor space should be provided for refrigerators, freezers, incubators, autoclaves and large centrifuges.

h) Furniture or equipment should not protrude into passage ways and exit routes of a laboratory.

i) Provision for adequate space and facilities for safe handling and storage of chemicals, compressed gas cylinders and other hazardous materials, etc. if they are to be used.

j) Consideration should be given for the provision of a pantry or separate room for consumption of food & beverages to avoid eating & drinking in laboratories.

k) Meeting or seminar areas should be separated from the laboratories.

l) Facilities for storage of street clothing and personal items of analysts should be provided outside the laboratory working areas. Suitable storage space for Personal Protective Equipment should be provided.

4.2.6. Security

a) The building must be planned for security. Restriction of access is of considerable importance to protect the integrity of the official regulatory samples, prevent unauthorized personnel from gaining access and also because of the extremely valuable and sensitive equipment used in the laboratory

b) Fire proof construction for the building must be ensured and such a building shoul be completely separated from the outside areas.

c) Adequate office space, isolated from the laboratory, but still near the laboratory (within the vicinity). It is prohibited to store and consume food, apply make-up or chew gums or any other edible material in areas where hazardous materials are used/ stored.

d) The laboratory shall have means of securing specifically regulated materials, such as legal samples, controlled substances (cyanide, alcohol, radioactive materials etc.)

e) A security system for a typical lab should include some means of access control, often arranged in layers within a building. A computerized security management system (SMS) like

- Keypad access control systems

- Biometric
- Card reader
- Special door hardware locksets

f) A means of visually monitoring sensitive or secure areas

- Security Guards
- Visitor control
- Video surveillance/Security camera

4.2.7. Laboratory Signage's

All labs must be provided with the following globally harmonized signs:

a. A Laboratory Information Card at the entrance door of each laboratory shall be identified and the Emergency exits shall be marked accordingly.

b. Health and Safety information should be posted on the door of each laboratory indicating accurately the hazards that could be there in the laboratory, personal protection required and the emergency contacts.

c. Identifier signs for all safety emergency equipment/devices

d. "Danger" identifier for toxic chemicals

e. "Flammable liquid" identifiers on all cabinets intended for flammable liquids.

f. "Acids" identifier on all cabinets intended for acids.

g. "Bases" or "alkalis" identifiers on all cabinets intended for alkaline liquids.

h. "Oxidizers" identifiers on all cabinets intended for strong oxidizers.

Globally harmonized laboratory signages are listed in Annexure VI

4.2.8. Corridors and aisles

a. Corridor widths and escape routes must be in accordance with the norms prescribed under the Building Codes of India.

b. Corridors and passages to the exits should be clear of all obstructions, such as furniture, instruments etc.

c. The minimum separation between a working bench and equipment placed on the floor (eg autoclave, refrigerator, centrifuge, etc) should be as per the following norms:

d. No worker on either side (90 cms)

e. Workers on one side of the aisle, no through traffic (100 cms)

f. Workers on both sides of the aisle, no through traffic (150 cms)

g. Workers on both sides of the aisle, plus through traffic (180 cms)

h. Heat generating equipment, such as ovens and incubators, should be located away from the corridors, aisles, passage ways and frequently occupied spaces and generally can be kept in a room designated as “Hot Room”.

4.2.9. Exits/Doors and Windows

a. The number of emergency exits must be in accordance with the building laws and codes.

b. The laboratory should have an Emergency Evacuation Plan and route for all buildings floors and areas and instructions must be posted in every laboratory section and corridor

c. Two or more well- marked & unobstructed evacuation exits are recommended in a lab

d. Laboratories shall have access doors which swing in the direction of egress (exit travel). Automatic self-closing doors are advisable and should open with minimum effort without the use of a key from inside at all times

e. Exit paths shall not be obstructed by lab furniture or equipment. To prevent blocking egress, lab benches and other furniture should be placed at least 5 feet (1.5m) from the exit door.

f. The main emergency egress from the laboratory shall have a minimum clearance of 3 ft (0.90 m).

g. All exit and emergency doors serving hazardous occupancies shall swing in the direction of egress (exit travel).

h. Each door in a laboratory room must have a view panel. or alternative means of viewing the laboratory activities from outside. Panels should be made of tempered/toughened glass.

i. On the wall/panel next to each door, entry into a laboratory must have a standardized clear frame (Board) with the room number/lab name and any hazard warning signage.

j. Provision for light switches, telephone, thermostat/ Relative humidity meter and fire extinguisher must be made inside the laboratory, adjacent to the door latch.

k. Laboratory doors which open towards egress/access corridors must not be vented

l. If the laboratory has openable windows, they must be fitted with insect screens

m. Special facilities should be provided for the safe access and egress of disabled persons, wherever applicable.

4.2.10. Flooring

a. The floor must be a one piece (seamless construction) impervious to water, resistant to acids, alkalis, solvents and disinfectants, easy to clean, slip- and wear-resistant and be chemical resistant and shall have covings to the wall. The floor area marked as classified in the Microbiological laboratory should be epoxy coated.

b. Tiles and wooden planks are not appropriate because liquids can seep through the small gaps between them.

c. The floor surface shall be coved, where it meets the walls and fixed benches/cabinets to ensure spills cannot penetrate underneath floors/cabinets.

d. Floors in storage areas for corrosive liquids shall be of liquid tight construction.

e. All edges at the walls should be sealed or welded to prevent seepage of spilled materials.

f. Supported coving should be used to facilitate easier cleaning and prevent contaminants from seeping into floor level service voids behind false walls.

4.2.11. Walls and ceiling

a. Wall surfaces should be free from cracks and unsealed penetration.

b. Walls should be non-porous and painted with a durable, impervious finish to facilitate decontamination and cleaning.

c. Ceiling heights should be sufficient to accommodate the safe installation of fume cupboards and Biological safety cabinets, where applicable.

d. Gypsum board ceilings should be finished with durable and impervious paint.

e. Ceiling-mounted lighting in laboratories where potentially infectious materials are handled should be recessed with a cover/diffuser flush at the ceiling level.

4.2.12. Sinks

a. Each laboratory must contain a sink with proper plumbing for hand washing alone. Hand free operation faucet controls (e.g. elbow-, foot-or sensor-operated) to prevent direct hand contact are recommended especially in Biosafety level 2, and other Microbiology laboratories

b. Hand wash facilities should be provided close to the exit of the laboratory for hand washing immediately before leaving the laboratory.

c. Each laboratory where hazardous materials are used should have a sink for hand washing.

d. Separate hand-washing sinks should be provided for Biosafety level 2 and Microbiology laboratories.

e. Sink faucets and hose bibs that are intended for use with attached hoses must be equipped with back siphon prevention devices.

f. Laboratory sinks shall have lips that protect sink drains from spills.

g. Stainless steel sinks should be preferred.

h. In the glassware washing room, a sink with a draining board will be more useful. It is preferable to have two-way or three-way laboratory type taps for the sinks.

4.3. Storage

4.3.1. Chemical Storage in the Laboratory/Bulk storage

a. Always read the chemical's label and mark it with the date of receipt before storing.

b. Never store highly reactive chemicals for more than 6 months.

c. Never store a chemical with an obscured or missing label.

d. Open shelves used for storage of chemicals or any other hazardous materials should have edge guards having dimensions (height 12.7 mm to 19 mm) to prevent containers/reagent bottles from falling off the back/front of the shelf

e. The shelves should be no higher than eye level. The shelves should be made of a chemically resistant material.

f. Never store liquids/ hazardous chemicals above the eye level.

g. Designate separate storage areas for highly toxic chemicals**.**

h. 'Flammable liquid storage cabinets' are required for flammable and combustible liquid storage.

i. Acids and bases should be stored separately in 'Corrosion resistant'-storage cabinets

j. Exhausts vents are usually not recommended for these cabinets, because the volatile vapours can escape into the building.

k. Chemicals should never be stored in a fume hood or directly on the floor.

l. Chemical storage rooms should be ventilated by at least 15 air changes per hour and should have dedicated exhaust systems.

m. Chemicals should be stored in plastic or metal containers whenever possible, not in breakable glass containers.

n. All chemicals should be properly labelled, and should be arranged on the shelf in ***chemically compatible families, and not alphabetically***. Chemicals can be stored alphabetically within the groups. A schematic layout for a Chemical storage room is shown in Figure 7

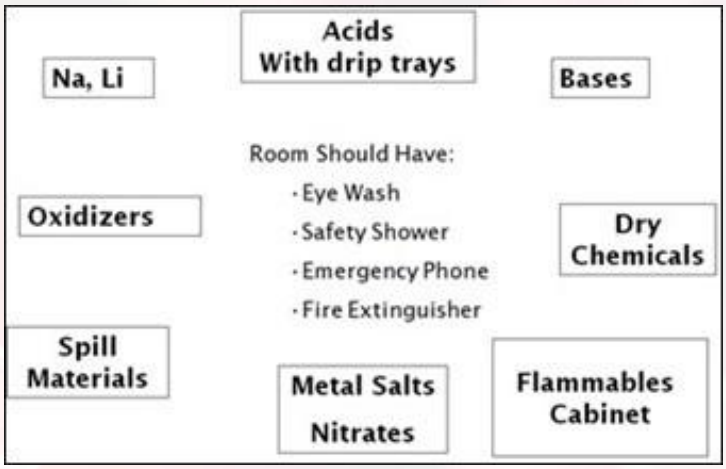

Figure 7. Schematic layout for a chemical storage area layout

4.3.2. Gas cylinder storage and gas lines

a. Empty and full cylinders should be stored in separate cages outside the laboratory on the ground floor

b. It is preferred and recommended to supply piped gas through clearly identifiable metal piping to instrument rooms and other equipment.

c. Compressed gas cylinders if used in the lab must be firmly attached to a secure structure by a non-combustible material, such as a metal chain. Nylon straps are not recommended.

d. Gas cylinders must be transported on purpose-built trolleys within the laboratory

e. Oxygen cylinders, full or empty should not be stored in close proximity to the flammable gases.

4.4. Laboratory and Personnel Safety

4.4.1. Safety Equipment

The availability and use of a number and type of safety equipment is essential and must be present in well-marked, highly visible and easily accessible locations in or near all the laboratory rooms in the facility and must be maintained in working conditions. **All laboratory rooms should be provided with the following Safety and Emergency Equipment**

a. Fume hoods (60–100 ft/minute capture velocity, vented outside) and safety shields with heavy base

b. Hand wash facility

c. Hand-free eye-wash stations (not eye-wash bottles) that conform to ANSI Z358.1–2004

d. Safety showers that conform to ANSI Z358.1–2004

e. Fire extinguishers (dry chemical and carbon dioxide extinguishers) and Sand

buckets

f. Fire blankets
g. Fire detection or alarm system with pull stations
h. Chemical storage cabinets (preferably with an explosion proof ventilation system)
i. Emergency lights
j. Emergency signs and placards
k. First-aid kits
l. Spill control kit (absorbent and neutralizing agents)
m. Large plastic buckets for carrying chemical bottles
n. Ground-fault interrupter electrical outlets
o. Separate Containers for broken glass and sharp materials
p. Material Safety Data Sheets (MSDSs) of all hazardous chemicals
q. Emergency action plan for the laboratory

4.4.2. Safety design in labs

a. In most cases, labs should be organized with the highest hazards (e.g., fume hoods) farthest from the entry door and the least hazardous elements (e.g., write-up stations) closest to the door.
b. Write-up desks and benches should be accessible without having to cross in front of fume hoods.
c. All safety equipment, such as emergency showers, eyewashes, first-aid kits and spill kits should be readily accessible.
d. An emergency centre in a central location on each floor, provides easy access for everyone. This centre should have reagent neutralizers, spill kits, first aid kit, etc
e. There should be at least one ABC fire extinguisher either inside the lab, or in close proximity.
f. Extinguishers should not be covered up or block access.
g. In each lab, there should be an eyewash unit, provided at least 10 seconds away from any analyst.
h. It should supply a multi-stream cross flow of water at 20-25 °C (65°- 75°F)
i. Contaminated eyes should be flushed for 15 minutes
j. Water flow at a rate of 10-20 L (3 to 7 gallons) of water per minute
k. Safety showers should never be more than 100 ft. away from the analyst, along a clear and unobstructed path.
l. Safety showers should be located in the corridor, clearly visible from the lab exits. All safety showers should include an eyewash.

m. Putting a floor drain under the shower is not recommended. To prevent contamination, it is preferable to allow the chemicals at the shower to be mopped up

n. Electrical apparatus, telephones, thermostats, electrical control panels, or power sockets should not be located within 0.5 m of the emergency shower or eyewash or within any area that may be considered as a splash or flood zone.

o. Safety showers should provide low-velocity water at 25-30 °C (70° to 90° F).

p. Manual close valves are recommended for all safety showers. A safety shower should be designed with an automatic cut-off.

4.4.3. Electrical Services and Safety

In a laboratory, a wide variety of electrically-powered equipment including stirrers, shakers, pumps, hot plates, heaters, power supplies, ovens, and others are used. The following are some basic guidelines for electrical services in the laboratories:

a. Electrical outlets should have a grounded connection (with earthing) and accept three-prong plugs. Multiple plug outlet adapters should not be used.

b. General power outlets should be above the bench height. Ceiling-mounted, or floor-mounted receptacles should be provided as needed for laboratories where equipment will be located away from walls to avoid trailing cables on the floors.

c. Electrical socket outlets, outlets for telecommunication appliances and outlets for computer networks should be positioned away from sinks/showers etc.

d. Electrical outlets should also be positioned as far as possible from valves for flammable gas and flammable solvent storage

e. Location of electrical panels and shut-off switches must be easily identifiable for quick disconnection of power in the event of an emergency.

f. Leave at least a 3-foot clearance around electrical panels, circuit boxes, etc for easy and ready access. Maintain an unobstructed access to all electrical panels.

g. Uninterrupted power supply required for equipment must be considered while designing the laboratory power supply system.

h. Emergency lighting and illuminated exit signs are mandatory to facilitate emergency evacuation in the event of power failure.

i. All the circuit breakers and the fuses should be labelled to indicate whether they are in the "on" or "off" position

j. Fuses must be properly rated.

k. Avoid using extension cords

l. Electric cables should not be routed over metal objects, such as emergency showers, overhead pipes or frames, metal racks, etc.

m. Avoid multi-outlet plugs unless they have a built-in circuit breaker.

4.5. Lab Furniture

4.5.1. Work Tables

a. The working surfaces should be hard, non-corrosive and non-adsorbent

b. The surfaces must be compatible with any chemicals likely to be used in the laboratory and must be impervious to water, resistant to acids, alkalis, solvents and disinfectants and easy to clean.

c. Bench tops should be of seamless design. If the bench top is placed against a wall, it shall be coved or have a backsplash against the wall.

d. Work surface front corners may be rounded for ergonomic reasons but rounded work bench with front edges should be avoided to prevent spills following the contours on to the under surfaces.

e. Bench height should depend on the working position of the laboratory users. Typical bench is about 90 cm high for standing work.

f. Typical bench depth is in the range of 60-90 cm (optimum 75 cm) for ease of access to the rear of the bench.

g. Work surface area for each worker must be more than 1.2 m across (recommended to be at least 1.5 m) and 0.6 m deep, excluding bench space for laboratory equipment (Figure 5a)

h. Deeper worktop may be required for specific and large equipment where access to back of the worktop is not normally required.

i. Sufficient leg/knee clearance should be left under the bench top for persons who use the bench top as a working/write-up area.

j. Personnel working within laboratory areas must be able to work and move unimpeded by each other and by fixed equipment.

k. As a minimum, there must be a 1.5 m passageway between benches, or 1.7 m passageway between back-to-back working benches (Figure 5A).

4.6. Waste Disposal

It is the clear responsibility of the Head/Chief Food Analyst and all analysts of the laboratory to ensure the safe and correct disposal of all the wastes produced during the analysis. Waste must be categorized by its identity, constituents, and hazards so that it may be safely handled and managed. Improper and irresponsible disposal of chemical wastes down drains or into the atmosphere is forbidden. **The Aldrich Handbook** provides a useful summary of the correct disposal procedure for most chemicals. '*Generated knowledge*' can be used for waste characterization, such as the knowledge of

waste characteristics and constituents by laboratory personnel who conduct the process, procedure, or experiment. It is essential that all the laboratory personnel accurately and completely identify and clearly label all the chemical and waste containers in their respective sections/laboratories.

4.6.1. Chemical Waste can be in the form of solvents, aqueous solutions, dry powders, and unwanted old chemicals. The following procedure should be implemented for proper disposal of chemical wastes:

I. Chemicals that can be washed down the drains with excess water

a. Concentrated acid after dilution and dilute acids and alkalis

b. Harmless soluble inorganic salts (including all drying agents, such as $CaCl_2$, $MgSO_4$, Na_2SO_4, P_2O_5)

c. Alcohols containing salts (e.g. from destroying sodium)

d. Hypochlorite solutions from destroying cyanides, phosphines, etc.

e. Fine (TLC grade) silica and alumina

II. No material on the "Red List" should ever be washed down a drain. This list is as follows:

a. Substances that do not mix or dissolve readily in water (e.g. fats)

b. Compounds of the following elements: - antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, tellurium, thallium, tin, titanium, uranium, vanadium and zinc.

c. Halogenated organic solvents/ organochlorine compounds (e.g. chloroform, dichloromethane, epichlorohydrin, carbon tetrachloride).

d. Toxic organic solvents (e.g. methanol, acetonitrile, xylene)

e. Organohalogen, organophosphorus or organonitrogen pesticides, triazine herbicides, any other biocides.

f. Cyanides and azides; Cyanide wastes must be placed in an appropriate waste bottle and the solution kept alkaline at all times.

g. Antibiotics

h. Formaldehyde or paraformaldehyde solutions

i. Phenol, benzene or derivatives of these

j. Mineral oils and hydrocarbons

k. Poisonous organosilicon compounds, metal phosphides and phosphorus element

l. Fluorides and nitrites

III. Solvent Waste collection in individual labelled containers for:

a. Halogenated solvents (methylene chloride, tetrachloroethylene, and chlorinated fluorocarbons)

b. Nonhalogenated solvents (acetonitrile, xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, methanol, and *n*-butyl alcohol).

c. Soluble organic waste including most organic solids

d. Paraffin and mineral oil (from oil baths and pumps)

IV. Each laboratory section should have the following waste bins preferably color coded and labelled. Ensure every bin has a lid. When the laboratory bin is ¾ full, the lid should be placed on the bin and the contents transferred to the larger solid waste bins:

a. ***Controlled waste***: Items in this category includes dirty paper, plastic, rubber and wood, which will be collected by the cleaners daily.

b. ***Glass***: All broken laboratory glassware including disposable test tubes, bottles etc

c. ***Bottles***: Empty reagent bottles to be collected separately. The tops/caps must be removed from all the bottles put out for disposal and there should be no detectable smell of chemicals from any bottle put for disposal.

d. ***Metal sharps***: Any sharp object like can tops, pins, syringe needles, scalpel blades, razor-blades, scalpel blades. Under no circumstances must any item of glass, sharp metal or fine powder ever be put in a normal laboratory waste bin

e. ***Plastic ware***: All disposable plasticware including, Eppendorf vials, syringes, pipette, tips, plastic bottles etc.

f. ***Batteries***: All used batteries

g. ***Waste for special disposal*** collected in labelled individual bottles

- Mercury
- Cyanide solutions
- The quantity of special waste must be kept to an absolute minimum and stored under suitable conditions.
- Should be disposed as per the regulations of the State Pollution Control Board

4.6.2. Biological Waste (Microbiology Lab)

Each individual laboratory may negotiate a contract with a commercial firm which is licensed by their respective State Pollution Control Board, to remove and transport biological wastes to a designated disposal site for incineration.

For safety reasons, all the disposable petri-plates used for the inoculation and enumeration of the microorganisms, should be autoclaved (steam sterilized) to inactivate the microorganisms. Once autoclaved, the wastes can be safely disposed of.

Melted agar must not be poured into sinks or floor drains. Allow it to cool and solidify for disposal as a bio waste, which can be placed with non-hazardous waste in the designated

waste containers.

4.7. Laboratory Information Management System (LIMS)

It is necessary for any laboratory to have an effective tracking system to track the information about the sample right from the place where it was picked up, its receipt in the laboratory till the report is generated. This software should also provide details about the usage of instruments, calibration and break down record, audit trail etc. Integrating LIMS with INFoLNET will enable the Food testing Laboratories and FSSAI to have complete information of the product analysis including the instrument details.

5. Budget allocations and delegations of powers

For running the lab smoothly and efficiently, minimum budget needs to be allocated for the maintenance of equipment, purchase of routine consumables, attending to minor repairs in the laboratory, meeting contingency expenses, etc. For smooth running of the day-to-day activities of the lab, an imprest amount/permanent advance of Rs 20,000 needs to be allocated to the Directors of the Labs/ Lab-in-charges/ Head of the laboratories, which can be recouped in 15 days/ one month based on the work load and geographic location of the laboratory. The Directors of the Labs/ Lab-in-charges/ Head of the laboratories should be delegated minimum financial powers of Rs.20,00,000/- (Rupees Twenty Lakhs) per annum for regular purchase of glassware / plasticware / chemicals, meeting expenses for breakdown of equipment or meeting contingent expenditures. This will help in efficient functioning of the laboratories and will improve the timely generation of reports as well as the productivity in the analysis of the samples.

It is important for all the food testing laboratories to have a minimum inventory of solid chemical stock, solvents, other reagents and liquid chemicals, glassware and microbiological media to avoid delay in testing of the food products or abandon the tests. The indicative list, but not complete of consumables and glassware with required quantity, wherever applicable can be found at Annexure II-V, while the complete details of the equipment along with specifications, warranty, CMC, outages, etc is presented separately as an attachment.

6. References:

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- Martin, P.G. 1997, The food control laboratory FAO, Food and Nutrition Paper 14/1Rev. 1
- National University of Singapore, Office of Safety, Health & Environment (2010) Laboratory Design Standard
- The management, design and operation of microbiological containment laboratories (First edition, published 2001). HSE Books
- WHO Good Practices for Pharmaceutical Microbiology Laboratories. WHO Technical Report Series, No. 961, 2011 Annex 2

Annexure-I

List of Equipment for a Basic Functional Food Analysis Laboratory

(Detailed technical specifications are appended with this document)

I. Equipment for Chemical analysis

1. Abbe's Digital Refractometer
2. Analytical Balance
3. Analytical Balance (Top Pan)
4. Atomic Absorption Spectrophotometer
5. Auto Titrator
6. Automated Fat Analyzer
7. Automated Fibre Analyzer
8. Automated Protein Analyser
9. Automatic Digital Polarimeter
10. Bomb Calorimeter
11. Conductivity and TDS Meter
12. Digital Butyro Refractometer
13. ELISA Reader with Plate Washer
14. Flame Photometer
15. Flash Point Apparatus (Pensky-Martens)
16. FT-IR with ATR & Liquid Cell
17. Gas Chromatograph
18. High Performance Liquid Chromatograph (HPLC)
19. Inductively Coupled Plasma Mass Spectrometer (ICP-MS)
20. Ion Chromatograph
21. Karl Fischer Coulometer/ Titrator
22. Lovibond Tintometer
23. Muffle Furnace
24. pH Meter
25. Soxhlet Fat Extraction System
26. Spectrofluorometer
27. Turbidity Meter

28. UV-Visible Spectrophotometer
29. Viscometer
30. Water Activity Meter

II. Equipment For Microbiology Lab

1. Anaerobic System with Anaerobic jar
2. Automatic Safety Bunsen Burner
3. Binocular Microscope
4. Bio Safety Cabinet Class II Type B2
5. BOD Incubator
6. Digital Colony Counter
7. Fumigator (Fogger)
8. Howard Mold Counter (Proprietary)
9. Incubators (37, 55, And 70 °C)
10. Lab Blender (Paddle Type)
11. Laminar Air Flow (Horizontal)
12. Micro Filtration Unit
13. Serological Water Bath
14. Trinocular Microscope with Digital Display System
15. Vertical Autoclave

III. General Equipment for both Chemical and Microbiology Analysis

1. Automated Solid Phase Extraction System
2. Bench Top Oil Bath
3. Bottle-Top Dispenser
4. Centrifugal Vacuum Concentrator
5. Centrifuge (Refrigerated
6. Circulating Cum Shaking Water Bath
7. Deep Freezer (Upright)
8. Digital Thermohygrometer
9. Dry Bath Incubator Mixer with Heating and Cooling
10. Electromagnetic Sieve Shaker

11. Frost Free Refrigerator
12. Fume Hood
13. Glassware Washer/Dryer
14. Homogenizer
15. Hot Air Oven (Forced Air Convection Oven)
16. Hot Air Oven (Glassware drying)
17. Hot Plate
18. Hot Plate Cum Magnetic Stirrer
19. Laboratory Grinding Mill
20. Microfuge
21. Micropipettes
22. Microwave Digestion System
23. Multi Tube Vortexer
24. Nitrogen Evaporator
25. Nitrogen Generator
26. Orbital Shaker
27. Rotary Evaporator
28. Solvent Filtration Unit
29. Ultra Low Temperature Vertical Deep Freezer
30. Ultra-Sonic Bath
31. Vacuum Oven
32. Vortex Mixer (Cyclomixer)
33. Water Purification System

Annexure-II

List of general chemicals

S. No.	Chemical Name	Quantity (g)
1.	Aluminium ammonium sulphate	500
2.	Aluminium oxide (active neutral)	100
3.	Ammonium acetate	500
4.	Ammonium carbonate	500
5.	Ammonium chloride	500
6.	Ammonium dihydrogen orthophosphate	500
7.	Ammonium ferric sulphate	500
8.	Ammonium ferrous sulphate	500
9.	Ammonium formate	500
10.	Ammonium molybdate	500
11.	Ammonium heptamoldybdate tetrahydrate	500
12.	Ammonium oxalate purified	500
13.	Ammonium purpurate	500
14.	Antimony trichloride	500
15.	Ammonium phosphorate dibasic	500
16.	4-Aminoantipyrine (99%)	100
17.	Auramine standard	1
18.	Antifoam Emulsion	100
19.	Antimony metal powder	100
20.	1-Amino-4-sulphonic acid	500
21.	Barbituric acid	500
22.	Barium chloride	500
23.	Barium hydroxide	500
24.	Benzoic acid	500
25.	Boric acid	500
26.	Bromocresol green	100
27.	Bromate standard	50

S. No.	Chemical Name	Quantity (g)
28.	Calcium carbonate	500
29.	Calcium chloride	500
30.	Chloroacetic acid	500
31.	Citric acid	500
32.	Cupric acetate monohydrate 99 %	500
33.	Cupric sulphate	500
34.	Calcium carbide	500
35.	Calcium hydroxide	500
36.	Chloramine- trihydrate 99%	50
37.	C18 silica powder 10 um	500
38.	Cis bixin	10
39.	Ciprofloxacin	10
40.	Carboxy methyl cellulose	100
41.	Cobalt sulphate	500
42.	Diphenyl carbazide	500
43.	Di potassium hydrogen phosphate	500
44.	Di sodium hydrogen orthophosphate	500
45.	2,1 Dichlorofluresceín	100
46.	4-(1-Methylamino) benzaldehyde	100
47.	4-Dimethylaminobaenzaldehyde for synthesis	100
48.	Disodium tartrate	500
49.	Borax (di-sodium tetraborate)	500
50.	Dioctyl sodium sulphosuccinate	500
51.	Activated charcoal	500
52.	Diastase from *Aspergillus*	100
53.	Dextrose anhydrous	500
54.	Eosin	10
55.	Ethylene diamine tetra acetic acid	500
56.	Fast green FCF	25
57.	Ferric chloride anhydrous	500

S. No.	Chemical Name	Quantity (g)
58.	Fluoride standard	1 gm
59.	Ferric citrate	500
60.	Gelatin powder	500
61.	Guaiacol	100
62.	Gamma Oryzanol	1 gm
63.	8-Hydroxyquinoline	100
64.	Hydroxynapthol blue	100
65.	Hydrazine sulphate	100
66.	Hexane sulphonic acid sodium	500
67.	Hydroxynaphthol blue	25
68.	Hydroxylamine hydrochloride	100
69.	Iodine	100
70.	Iron (II) sulphate heptahydrate	500
71.	Iron (III) chloride anhydrous	500
72.	Indoxyl acetate	100
73.	L- Tryptophan	500
74.	L(+)-Tartaric acid	500
75.	Lactose	500
76.	Lead (III) acetate trihydrate	500
77.	Lead carbonate 99%	500
78.	Selenium dioxide	500
79.	Magnesium chloride	500
80.	Magnesium sulphate	500
81.	Methyl orange	100
82.	Methyl red	100
83.	Methyl blue	100
84.	Mercuric oxide red	250
85.	Mercury (II) iodide red	250
86.	Metanil yellow	100
87.	Methyl 4 hydroxybenzoate	500

S. No.	Chemical Name	Quantity (g)
88.	Mercuric sulphate	500
89.	Mercuric chloride	100
90.	Meso erythritol	100
91.	Ninhydrin	100
92.	N-1-Naphthyl ethylene diamine dihydrochloride	250
93.	2-Nitrobenzaldehyde	250
94.	Neotame	100
95.	N,N,Dimethyl-1,4-phenylenediamine	5
96.	N-1-Naphthyl ethylene diamine	25
97.	N, N diethyl p-phenylenediamine	50
98.	Orange-G stain	100
99.	Oxalic acid	500
100.	Oxytetracycline hydrochloride	100
101.	Phenolphthalein	100
102.	Phloroglucinol	100
103.	Picric acid	100
104.	Potassium bromide (99.5%)	500
105.	Potassium chromate	500
106.	Potassium dihydrogen orthophosphate	500
107.	Potassium ferrocyanide 98.5%	500
108.	Potassium hydroxide pellets	500
109.	Potassium iodate	500
110.	Potassium oxalate	500
111.	Potassium permanganate	500
112.	Potassium sodium tartrate	500
113.	Potassium ferrocyanide	500
114.	Potassium sulphate	500
115.	p- Rosalic acid	500
116.	p-Toluidine pure	500
117.	Potassium chloride	500

S. No.	Chemical Name	Quantity (g)
118.	Phenol (hydroxy benzene)	500
119.	Potassium thiocyanate	500
120.	Potassium lactate solution	500 ml
121.	Phenol crystals	500
122.	Phosphorus pentoxide	500
123.	Pyrrolidine	500
124.	Potassium dihydro orthophosphate	500
125.	Potassium persulphate	500
126.	Rhodamine B for microscopy	100
127.	Silica gel (60-120) mesh	2 x 500
128.	Sodium acetate	500
129.	Sodium carbonate	500
130.	Sodium chloride	500
131.	Sodium hydrogen carbonate	500
132.	Sodium hydroxide pellets	2 x 500
133.	Sodium molybdate dihydrate 99%	500
134.	Sodium nitrite	500
135.	Sodium phosphate monobasic dihydrate	500
136.	Sodium sulphite	500
137.	Sodium sulphite anhydrous	500
138.	Sodium thiosulphate	500
139.	Solochrome black	100
140.	Sodium arsenite 98%	500
141.	Sorbic acid	100
142.	Stannous chloride	500
143.	Starch soluble	500
144.	Sudan Dye lll	100
145.	Sulphanilamide 99%	500
146.	Sulphur powder	500
147.	Silver nitrate	100

S. No.	Chemical Name	Quantity (g)
148.	Silica gel pore size (60A 70-230 mesh)	5 × 500
149.	Silica gel (Coarse)	5 ×500
150.	Silica gel	5 ×500
151.	Sodium lauryl sulphate	500
152.	Sodium thiosulfate pentahydrate	500
153.	Sulphanilic acid	500
154.	Sodium tungstate dihydrate 98%	100
155.	Sodium diethydithiocarbamate trihydrate	100
156.	Starch from rice	500
157.	Starch from corn	500
158.	Sodium propionate 99.0%	100
159.	Sodium perchlorate	100
160.	Sodium hydroxide pellets	500
161.	Sodium metasilicate	100
162.	Tetrabutylammonium hydrogen sulphate	100
163.	Trisodium citrate	250
164.	Trisodium phosphate	250
165.	Tannic acid	250
166.	Tartaric acid	500
167.	Toluene	2 x500
168.	Urea	500
169.	Uric acid	250
170.	Zinc acetate	500
171.	Zinc metal	500
172.	Zinc oxide	500
173.	Zinc heptahydrate sulphate	500

Annexure III

List of solvents, acids and other chemicals

S. No.	Name of the solvent	Quantity
1.	Acetone	5 x 500 ml
2.	Aniline	1 x 500 ml
3.	Acetic acid	2 x 500 ml
4.	Amyl alcohol	2 x 500 ml
5.	Acetonitrile	5 x 500 ml
6.	Benzene (crystalizable)	3 x500 ml
7.	Bromine water	3 x 100 ml
8.	Butan-1-ol	3 x 500 ml
9.	Boron trifluoride methanol complex	3 x 100 ml
10.	Bromine for analysis	1 x 100 ml
11.	Carbon disulfide	3 x 500 ml
12.	Chloroform	3 x 500 ml
13.	Carbon tetrachloride	5 x 500 ml
14.	Castor oil	1 x 500 ml
15.	Chloral hydrate	1 x 100 ml
16.	Dichloromethane	2 x 500 ml
17.	Dimethyl ether	5 x 500 ml
18.	Diethylene glycol	1 x 500 ml
19.	Dimethyl sulphoxide	1 x 500 ml
20.	Dibromopropane	1 x 500 ml
21.	Ethanol (absolute)	10 x 500 ml
22.	Ethyl acetate	3 x 500 ml
23.	Furfuraldehyde	1 x 500 ml
24.	Formaldehyde solution	3 x 500 ml
25.	Formic acid (85%)	1 x 500 ml
26.	Furfural	1 x 500 ml
27.	Glycerol	3 x 500 ml
28.	Hexane	5 x 500 ml
29.	Hydrofluoric acid	5 x 1 L
30.	Hydrogen peroxide	500 ml
31.	Hydrochloric acid	5 x 1L
32.	HPLC grade water	10 x 500 ml
33.	Hydrogen peroxide (30%)	500 ml
34.	Isobutanol	5 x 500 ml
35.	Liquid ammonia	3 x 500 ml
36.	Methanol	5 x 500 ml
37.	Methyl -tert -butyl ether	1 x 500 ml
38.	n-Butanol	5 x 500 ml
39.	n- Heptane	5 x 500 ml

S. No.	Name of the solvent	Quantity
40.	Nitric acid 65%	5 x 500 ml
41.	Nitric acid (Conc)	2 x 500 ml
42.	Orthophosphoric acid	2 x 500 ml
43.	Olive oil	1 x 500 ml
44.	Petroleum ether (40-60°)	10 x 25 L
45.	Petroleum Ether (60-80°)	10 x 25 L
46.	Propan 2-ol	5 x 500 ml
47.	Pafaffin	2 x 500 ml
48.	Pyridine	2 x 500 ml
49.	Sulphuric acid	5 x 2.5 L
50.	Silicone oil	1 x 500 ml
51.	Silicone	1 x 500 ml
52.	Sesame oil	1 x 500 ml
53.	Trifluoracetic acid	1 x 500 ml
54.	Toluene	5 x 1 L
55.	Triethylamine	1 x 500 ml
56.	Tetrachloroethylene	1 x 500 ml
57.	Wij's solution	10 x 100 ml
58.	Xylene	5 x 500 ml

Note: The chemicals may be selected from the list as per the testing scope of the Lab and as per the procedure for analysis mentioned in the FSSAI Manual. Food Testing Laboratories may enter into Rate Contract with the reputed manufacturers/ suppliers of glassware, chemicals, consumables, etc or adopt the rate contracts done by any Central Government /State Government Academic and /or Research Organization for procurement of chemicals, reagents, other consumables from their Authorized distributors.

The Laboratories are advised to buy the grades of purity as recommended in the FSSAI Manuals of analysis or as prescribed in the method adopted.

Laboratory reagents are classified on the basis of purity and intended use. Choice of the right grade of reagent by the analyst is essential for the application in hand and it is also important to use reagents from same source for high precision of results.

1. ***ACS Reagent grade***- means that it conforms to specifications defined by the Committee on Analytical Reagents of the American Chemical Society. Such grades are useful for high quality work.
2. ***ANALAR***-Such reagents used mainly for analytical applications, research and quality control.
3. ***AR (ANALYTICAL REAGENT)*** grade –essential for high precision analytical purpose and research work having high purity. Trace impurities are restricted to

lowest possible limits for high precision. The certificate of guarantee gives the minimum assay and maximum limits of trace impurities. If such reagent meets the ACS specifications it will be denoted as AR (ACS).

4. ***CP (CHEMICALLY PURE)***: Chemicals being used for regular practical having its original purity.
5. ***Extra pure grade –*** suitable for laboratory accreditations and also work requiring compliance with pharmacopoeia standard requirements.
6. ***General reagent (GR)*** – reagent that meets or exceed AR grade specifications
7. ***Guaranteed Reagent (GR)*** — Suitable for use in analytical chemistry, products meet or exceed American Chemical Society (ACS) requirements.
8. ***Lab Grade***: A chemical grade of relatively high quality with exact levels of impurities unknown; usually pure enough for general applications. Not pure enough to be offered for food, drug, or medicinal use of any kind.
9. ***LR: (LABORATORY REAGENTS):*** This grade consists of Pure, Extra Pure, Purified organic and inorganic chemicals having reliable accuracy in Routine Laboratory Analysis.
10. ***N.F. Grade***: A grade of sufficient purity to meet or exceed requirements of the National Formulary (NF).
11. ***P.A***. (Proanalysis) These reagents comply to maximum tests of ACS grades,
12. ***PURISS***
13. ***Reagent Grade***: High purity generally equal to A.C.S. grade and suitable for use in many laboratory-and analytical applications.
14. ***Synthesis grade*** – for organic synthesis and preparative tasks having many potential applications in laboratories
15. ***Technical grade*** – suitable for non-critical tasks such as rinsing, dissolving, etc.
16. ***U.S.P. Grade***: A chemical grade of sufficient purity to meet or exceed requirements of the U.S. Pharmacopeia (USP); acceptable for food, drug, or medicinal use; may be used for most laboratory purposes.

Classification based on applications

1. ***Microscopy (M.S.) Grade***: Highly purified reagent for use in biochemical research and analysis. They are free from inhibitors, such as traces of heavy metals and tested with a view for biochemical work.
2. ***HPLC Grade***: Solvents meet strict UV absorbance specifications and are filtered for removal of sub-micron suspended solid with low acidity and alkalinity, and low evaporation residue levels.

3. ***HPLC-Gradient grade***: HPLC Gradient solvents offer the same high quality as HPLC solvents, but with added testing for suitability in HPLC with gradient analysis and spectrophotometry. These solvents enable one to minimize the gradient effect of the solvent involved

4. ***LC-MS grade****:* This grade of solvent is especially optimized and tested for LC-MS suitability in that they have low level of ionic background and low ion suppression to meet all the requirements of LC-MS ionization methods (ESI/ APCI – positive and negative mode) and ensure high reproducibility and high ionization efficiency

5. ***Deuterated solvents*** (Spectroscopy Grade): Nuclear magnetic resonance spectroscopy is the most commonly used technique in the structural analysis of compounds obtained by organic synthesis. It normally requires the sample to be dissolved in a solvent whose hydrogen atoms have been replaced with deuterium atoms of differing isotopic purities. The most usual is 99.8% but we also have purities of up to 99.98%.

6. ***Residue grade solvents***: Solvents suitable for pesticide residue analysis, which have GC impurities below ppt/ppb levels as tested by the ECD.

7. ***Nano grade*** –meet ACS grade specifications used for extraction and pre-concentration applications

Annexure-IV

List of glassware, general apparatus and miscellaneous accessories

1. Beakers (Different capacities)
2. Bell Jar
3. Blue litmus paper
4. Burettes
5. Crucibles
6. Conical flasks with stoppers
7. Desiccators/vacuum desiccators
8. Digestion Flasks (300 ml)
9. Erlenmeyer Flasks
10. Filter paper circles and sheets of different grades
11. Funnels
12. Glass Pipettes
13. Glass beads
14. Gooch crucibles
15. Kjeldhal Distillation flasks
16. Litmus Paper
17. Measuring cylinders
18. Pipette bulbs
19. Pumice fine powder
20. Litmus papers
21. Separating Funnels
22. Sieves
23. Silica dishes
24. SO_2 Distillation set
25. Soxhlet Extraction Unit
26. Test tubes all sizes (stoppered and un stoppered
27. Thimbles 20/80
28. TLC Chamber rectangular
29. (250 x 250 x 120 mm)
30. Tripod Stand

31. Volumetric flasks
32. Vacuum grease
33. Wash bottles (glass and plastic)
34. Wire gauze

Microbiology Laboratory:

a) Test tubes
b) Petri Dishes
c) Durham's tubes
d) Dilution and media storage bottles
e) Spreaders.
f) Slides and cover slips.
g) Disinfectant jars
h) Inoculation loops
i) Non – adsorbent cotton wool

Annexure V

Indicative list of media used in microbiology analysis

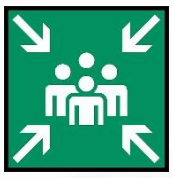
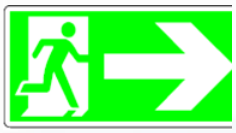
S. No	Name of media
1.	Acetate Agar
2.	Andrade peptone water
3.	Asparagine-Proline Broth
4.	Baird Parker Agar
5.	Bile Esculin Azide Agar
6.	Bile salts agar
7.	Bismuth Sulphite Agar
8.	Blood agar
9.	Brain Heart Infusion Broth
10.	Brilliant green agar
11.	Brilliant Green Lactose Bile Broth
12.	Bromocresol Purple Carbohydrate Broth
13.	Buffered Peptone Water
14.	Butterfield's Buffered Phosphate Diluent
15.	Carbohydrate Utilization Broth
16.	Cetrimide agar
17.	Chloramphenicol Yeast Glucose Agar
18.	Cooked Meat Salt Medium
19.	Czapek Yeast (Autolysate) CYA agar
20.	Decarboxylase Test Medium (Lysine, Ornithine, Arginine provide separately)
21.	Deoxycholate Citrate Agar Medium
22.	Dextrose Tryptone Agar
23.	EC Broth
24.	Egg Yolk Tellurite Supplement
25.	Frazer Broth
26.	Gelatin agar
27.	Gelatin Phosphate Salt Broth
28.	Glucose Salt Teepol Broth
29.	Gram Negative Broth (GN)
30.	Half Frazer Broth
31.	Hektoen Enteric Agar
32.	Hugh Leifson Medium
33.	Kauffman Mueller's Tetrathionate Broth Base
34.	Kligler Iron Agar
35.	Koser's Citrate Broth
36.	Lactobacillus MRS Agar
37.	Lactose Broth

S. No	Name of media
38.	Lactose Gelatine Medium
39.	Lauryl Tryptose Broth
40.	Levine Eosin-Methylene Blue Agar (L- EMB Agar)
41.	Liver Broth
42.	Lysine decarboxylase broth
43.	Lysine Iron Agar
44.	Malonate Broth
45.	Malt Agar
46.	Mannitol Yolk Polymyxin (MYP) Agar
47.	McConkey broth/agar
48.	Methyl Red Voges Proskauer (MR-VP) (Glucose Phosphate Broth
49.	Milk agar with cetrimide
50.	Modified Oxford Agar
51.	Motility Test Medium
52.	MY-40 Agar
53.	Nitrate Broth
54.	Nutrient Agar
55.	Nutrient Broth
56.	Palcam Agar
57.	Peptone
58.	Peptone Water Diluent
59.	Phenol Red Carbohydrate Broth
60.	Phosphate Buffered peptone water
61.	Plate Count Agar
62.	Potato Dextrose Agar
63.	*Pseudomonas* Presumptive Test Broth
64.	*Pseudomonas* confirmation medium (Skim Milk Agar)
65.	Rappaport Vassiliadis Soya Broth
66.	Selenite Cystine Broth
67.	Selenite F broth
68.	Sheep Blood Agar
69.	Simmons Citrate agar
70.	Slanetz and Bartley Medium
71.	Sulphite Agar
72.	T1 N1 Agar
73.	Tergitol-7 Agar Base
74.	Tetrathionate Broth
75.	Thioglycollate Agar
76.	Thiosulfate-Citrate-Bile Salts-Sucrose Agar (TCBS)
77.	Triple Sugar Iron Agar
78.	Trypticase Soy Broth

S. No	Name of media
79.	Tryptone Broth
80.	Tryptone Glucose Extract Agar
81.	Tryptone soya agar
82.	Tryptose-Sulfite Cycloserine (TSC) Agar
83.	Urea Broth
84.	Violet Red Bile Agar
85.	Xylose Lysine Deoxycholate Agar (XLD)

Annexure VI

Lab Signage Definitions and Symbols

Personal Protection: Mandatory requirement				
 Protective clothing	 Hearing protection	 Eye protection	 Hand protection	 Hand wash
 Respiratory protection	 Foot Protection	 Eye and face protection		
Safety Equipment				
		 First aid	 Emergency assembly location or Assembly point	 Emergency exit
 Fire extinguisher	 Fire Blanket	 Fire hose		 Recycling symbol

Prohibition signage's				
 Prohibition symbol	 No admittance to unauthorized personnel	 No smoking	 No open toed shoes	 No food or drink allowed
 No open flames	 No dumping chemical in sink.	 Non-potable water not for drinking	 Do not touch	 No pacemaker /metallic implants
 Do not eat or drink	 Do not enter			
Physical Hazards/Danger				
 Unstable explosives	 **Flammable**	 **Oxidizing**	 **Compressed Gas**	 **Corrosive & health hazard**
Health hazards				
 Systemic Health Hazard	 Toxic Acute toxicity	 Harmful	 Environmental Hazard	 Radiation Symbol

Warning signage's				
 Biological hazard	 Laser hazard	 Radioactive/ ionizing radiation	 High voltage	 Hot surface/high temperature
 Extreme cold temperature	 Non-ionizing radiation	 Strong Magnetic Field	 Optical Radiation	 Chemical Weapon

APPENDIX

TECHNICAL SPECIFICATIONS OF EQUIPMENT

PART A: PRIMARY ANALYTICAL EQUIPMENT

1. ANALYTICAL BALANCE	
Application: An analytical balance is used to measure mass to a high degree of precision and accuracy. It is most often found in a laboratory setting and is used for accurate weighing. Balances should be housed in a draft-free location and on a vibration free bench. Some modern balances have built-in calibration masses to maintain accuracy	
Specification	**Requirement**
Capacity	200 g/ 210 g/ 220 g
Least count	0.00001 g (.01mg)
Readability	0.01mg (0.00001 gm) or 0.1 mg (0.0001 gm) Lab can choose the readability required
Repeatability (Standard deviation)	±0.1 mg
Linearity	□0.2 mg or better
Response time	Less than 10 sec
Stabilization (typical and fast)	Approx. 4.0 sec (0.1mg) / 15 sec (0.01mg)
Weighing pan	• Circular/square/rectangular • Single Pan Top • Grid type • Eccentric load deviation 0.2/0.25 mg
Minimum overall diameter of pan	8-10 cm
Tare facility	Yes
Calibration (internal)	• Fully automatic, time/ temperature controlled internal calibration • Should be capable to adjust itself • Must be provided with calibration certificate by an agency accredited by NABL or with traceable to International Standard.
Balance leveling	Balance should indicate immediately as & when it is required to be leveled and should have the facility for horizontal plane calibration (mercury bubble adjustment), if not otherwise available.
Weight Box traceable to international standards	• 1 mg - 200 g, E2 (1 no) • Accuracy class acc. to OIML R111: E2 • Nominal mass value: 1 mg to 200 g. Up to 500 mg as wire weights • Susceptibility: 0.002 – 0.004 • Material: special steel, non-magnetizable, density 8.0 g/cm3, highly corrosion-resistant, knob weights highly polished and laser marked, in wooden case.

Operational requirements	• Digital display: Backlit display with soft touch screen operation along with accessibility to date and time etc. • To have inner adjustable draft shield • Glass draft shield with flexible configuration for left/right hand operation • Weighing with automatic and manual start and provision for data interface the manufacturer to provide the specification data needed to facilitate calculation of uncertainty • Optional: Printer should be available with USB port for data transfer.
Environmental factors	• Safety for electromagnetic compatibility • Permanent shock absorption facility • Capacity of operating in temperature range between -5 deg C to 45 deg C and relative humidity of 80%
Supplier/ manufacturer	Must be ISO certified for quality
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Operating manuals, service manuals, other manuals	Should provide: - User, technical and maintenance manuals in English language List of procedures required for local calibration and routine maintenance Service and operation manuals to be provided Advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier must carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all the spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Back-up rechargeable battery	Back-up battery for use of equipment during power shut down.
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument

After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. • Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance Demonstration

2. ANALYTICAL BALANCE (TOP PAN)	
Application: An analytical balance is used to measure mass to a high degree of precision and accuracy. It is most often found in a laboratory setting and is used for accurate weighing. Balances should be housed in a draft-free location on a vibration free bench. Some modern balances have built-in calibration masses to maintain accuracy	
Specification	**Requirement**
Design	Top Pan loading
Capacity	0.01gm -1200gm
Weighing pan	Circular/ Square Top
Range (weight):	0.01 –1200 gm
Accuracy:	0.01 gm
Readability:	0.001 gm
Repeatability	0.001 gm
Linearity:	0.002 gm
Response time:	1.5 s
Calibration:	automatic/internal
Display	Touch Screen/
Stabilization Time	2 Seconds (typically).
Tare facility	Yes
Calibration (internal)	Yes Must be provided with calibration certificate by an agency accredited by NABL or with traceable to International Standard
Operational requirements	Capable of operations by multiple users without disturbing settings Digital display: Backlit display with soft touch screen operation along with accessibility to date and time etc. Provision of connection with computer
Environmental factors	Capacity of operating in temperature range of 15 deg C to 45 deg C and relative humidity of 80%
Supplier/ manufacturer	Must be ISO certified for quality
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided Advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)

Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery back-up	Rechargeable internal battery
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

3. ATOMIC ABSORPTION SPECTROPHOTMETER	
Application: Atomic Absorption Spectroscopy (AAS) is used for quantitative and qualitative analysis of various metals in variety of food and water samples at the picogram level. It measures the amount of particular wavelength of light absorbed by the element to promote electrons from one energy level to another, higher, energy level. It typically consists of a 'light source' which emits specific wavelengths of light that are ideally only absorbable by the analyte; an 'atom cell or atomizer' which convert the samples into gaseous atoms; a 'detection system' that serves to isolate and quantify the wavelengths of interest and a computer system to control instrument operation and collect and process data	
Specification	**Requirement**
General	Fully Automated Computer controlled Integrated (graphite-furnace and flame) Atomic Absorption Spectrometer with Flame (Air Acetylene and nitrous oxide- acetylene) and Graphite Tube Atomizer Chiller / Water circulating unit, with Auto samplers and Flame with 100 or more vial positions.
Wave length range	185-900 nm or better
Sensitivity	At least 0.9 A for 5µg/ml aqueous copper standard solution with air – acetylene flame
Optics	A true Dual Beam dual-blazed / holographic Czerny turner Monochromator/ fibre optic technology/ or equivalent technology Focal length: at least 250 mm focal length Resolution: 1800 lines / mm Width: Automatic bandwidth of 0.2 to 2.0 nm
Detector	: Photomultiplier Tubes (PMT) or Solid-State Detector
Sensitivity	Greater than 0.7 absorbance with the precision of <0.5% RSD from 5 second integrations for 5 ppm Cu standard, or equivalent sensitivity (i.e. 0.3 absorbance with <0.5 % RSD from 5 second integrations for 2 ppm Cu standard)
Flame Atomizer	• All coded titanium or equivalent burner with impact bead / Flow spoiler, premix Design • Movement: Permanently aligned or Automatic movement into the sample compartment • Affect from Acids /Organic solvent: Unaffected from attacks by acid solution or organic solvents • Flame Alignment in liquid beam Fully automatic, optimized with motorized burner mount for vertical and/or horizontal • burner adjustment
Nebulizer	High precision able to provide manually adjustable uptake rates material of the nebulizer and related Venturi should be inert to acid solutions and organic solvents.

Flame and Gas Controls	Flame Control: Fully Computer controlled ignition/3 stage safety control ignition. Gas Control: Fully Computer controlled with oxidant and fuel gases monitoring to monitor constant fuel / oxidant ration ignition Safety Function Interlocking system to prevent ignition Essential Interlock Monitor Burner type as well as its presence in position, air selector, flame sensor, liquid trap level, gas supply pressure and air supply anywhere in the network of gas tubing in the system. Automatic Lamp Selection Function Computer controlled Hollow Cathode Lamp selection and alignment
Lamp Holder	At least 8 lamp holders with built in power supplies for Hollow Cathode lamps/ Boosted Hollow Cathode lamps/ Super Lamps/ Ultra Lamps and Electrode – less discharge lamps or equivalent, integrated RFID tool or with a provision for automatic aligning turret with computer controlled lamp selection for both flame and furnace.
Autosamplers	Dedicated & Permanently aligned Auto sampler for GTA, Dedicated Auto sampler for Flame and VGA Units with 100 or more vial positions each. Should have Sample rack for vials & supplied with two sets of sample vials
Operating Parameter setting	Automatic Setting
Read Out /Display	For absorbance as well as concentration, Display of errors or error codes, absorbance range at least up to 2.0 Abs.
Scale Expansion	Scale expansion at least up to 100x
Integration time	Integration time should cover at least 3 to 50 seconds range
Measurement	Measurements of mean, RSD and CV, Background only mode, Integration of peak height and peak areas
Accessories/ Spares	All accessories with Flame AA System
Vapour Generation Assembly:	Should be continuous flow-based hydride / mercury vapour generator to be used with a programmable auto sampler
Precision	Better than or at least 1% at ppb levels of mercury, arsenic etc.
Mercury amalgamation	Mercury amalgamation unit
Absorption Cell	The absorption cell's material should have no effect of the high heat of the flame and the cell for the analysis of mercury should be of a closed cell design
Flame Arrester	Flame arrester should be provided, if applicable in the tube which connects the assembly to the absorption cell
Cell Design holder	The design of the cell holder should give a firm and easily adjustable (for alignment) mounting on the burner head.
System accessories	Complete with necessary reagent bottles, connectors etc.

Hollow Cathode lamps	Hollow cathode lamps. One lamp each for the elements: Arsenic, Antimony, Boron, Calcium, Chromium, Cobalt, Copper, Iron, 19 Nickel, Lead, Manganese, Mercury, Selenium, Tin, Vanadium and Zinc. All lamps should be coded lamps only. Non coded lamps will not be acceptable. Equivalent coded lamps will also be acceptable.
Air Compressor	An imported air compressor (oil free, noiseless air compressor with regulators air purifiers and moisture trap) with necessary tubing and connectors and should meet the air supply requirements of AAS operation
Oil Free Pump	Oil- free pump and moisture trap Corrosion Resistant to acidic vapor and the drain value (if any) should be made of stainless steel of equivalent corrosion resistant material
Nitrous oxide gas regulator	Nitrous oxide gas regulator (two stages) with heater, with necessary tubing and connectors. Transformer if necessary should be provided to transform this supply to the requirements of the heater. The heater should work on 230±10volts 50 Hz AC power supply
Acetylene Gas regulator	Acetylene gas regulator (two stage) with necessary tubing and connectors
Nitrogen and Argon Gas regulator	Nitrogen and Argon regulator (two stage) with necessary tubing and connectors
Graphite Furnace System	Graphite Tube: Atomizer Should be computer controlled fully enclosed graphite tube system consisting of stabilized temperature / total pyrolytic graphite plate form/wall atomization. The system should also be equipped with an integrated graphite furnace camera for easy autosampler tip alignment and real time viewing of the process happening in graphite furnace.
Background correction technology	The system should be fitted with D2 background correction for flame technique and Zeeman background correction for furnace technique.
Gas Supplies	Provision of two gas supplies (program selectable) with independent control over the gas supply through the furnace
Heating Rate	Heating rate of at least 2000°C per second
Temperature Range	Temperature range ambient to 2600°C or more in 10°C Increments
Feedback system	Feedback system for furnace temperature control, interlocks for water, gas, temperature, furnace door, graphite tube damage and mains power
Temperature Programming	At least 8-10 steps temperature programming facility with flexibility of program selection, ramp time, gases, gas flow and read trigger for 20 each temperature step
Furnace Control:	Computer controlled with appropriate provision for print out of the furnace and sample parameters
Display	Calibration data / graphs, temperature profiles, signal graphics and the instrument status onscreen

Memory:	Memory should be able to store at least ten nonvolatile Programs
Cooling Water Re-circulation Unit	An imported recirculating water chiller unit of appropriate capacity. No discharge of water from this water circulation unit
Data work station	Application Software: • Program facility with multitasking software • Should provide complete control of instrument with instrument status display and its various accessories. • Provide accurate and reproducible time averaged, integration, non – averaged integration, multi-level calibration. • Software should handle instrument linear absorbance reading, concentration, or emission intensity, integration time, built-in statistics, calibration equation control, slope of analytical curve using operator selective calibration standard • Built-in interface for computer connection and use of optional accessories. • Comprehensive quality control protocols facility including blank, multiple quality control standards, QA/QC audit trail and calibration failure.
Standards	Standards: NIST traceable standards for each element separately 100 ml (1000 ppm) each for Na, K, Ca, Mg, Al, Fe, Mn, Ba, Sr, , Cu, Cr, Ni, Co, Mo, Cd, Pb, Zn, As, Hg, Se
Computer system:	Make: Reputed brand such as HP/Compaq/IBM/ Dell Processor: Intel core 2 duo processor 3.00 GHz or highest version RAM: 4 GB (upgradable up to 8 GB) HDD 500 GB ultra DMA or higher HDD (7200 RMP) Monitor: 21” TFT – LCD Flat Colour CD ROM: 52X CD- ROM DVD-CDRW: 32X DVD-ROM and CDRW – combo Drive Max speed 48x24x48 Ports: 2 serial, 1 parallel and 2 USB front 6 rear USB2 PS/2 Port, 1 VGA integrated Port 1line in/out port Key Board: 104 keys Mouse: Optical mouse with pad Ethernet: 32 bits auto selectable 10/100 MBPS Graphics: Internet ready with integrated graphics Sound: Integrated sound card and inbuilt stereo speakers Printer HP Laser jet Printer 1200 x 1200 dpi 12 PPM black.
Operation software	Preloaded Windows of most recent version of operating system with License MS Office Most recent licensed version with media, manual Preloaded Antivirus with latest version along with License

Additional items	• Operation Kit: Manufacturers Standard Operation Kit including all required items, tubing, fittings for startup / regular operation of instrument. • Operation / maintenance: Manual Operation / maintenance Manual for each unit Analytical manual • Analytical manual: including applications for flame, VGA and graphite system Service Manual • Service manual: with one set of required tools for each system / unit • Trouble Shooting Charts, Spare parts Catalogue, Application Notes for trace metal analysis in food and water samples • Dust Cover One for each unit • Consumables for 5000 analyses for each of the following units for each of the following units: Flame AAS (basic unit, burner system) Vapor generation assembly Graphite Furnace Atomizer and Auto samplers
Supplier/ Manufacturer	Must be ISO certified for quality
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) Electrical Safety conforms to EN 61010-1:2016/61101-1/IEC61010-2-40 Should have necessary certification for safety and quality standards from national/ international bodies Electromagnetic compatibility as per 61326-1:2013
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument

After sales service/Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. • Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance Demonstration

4. AUTOMATIC FIBRE ANALYZER	
Application: It is used for analysis of crude fiber content of food through acidic or alkaline hydrolysis. It eliminates chemical and hot water handling and requires less bench space.	
Specification	**Requirement**
Features	• The system must be closed and microprocessor controlled, capable of performing all operations, extraction, rinsing & filtration of samples for analysis of crude fiber, acid detergent fiber, neutral detergent fiber, etc. • Should have agitate/heat Switch & temperature/timer/clock controller for process parameter input and results readout. • System should be based on either crucibles or filter bag technology
Analysis of sample	Should have possibility of analyzing 6/12/24 samples at a time
Sample size	≤ 1 gm
Measuring range	0.1 to 100%
Reproducibility	± 1 % relative at 5 % - 30 % fibre level
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction.
Accessories to be supplied	• In case of fiber bag system 1000 filter bags should be quoted along with the system • In case of crucible-based system, the following accessories must be essentially quoted for o Cold extractor o 24 Crucibles of P2 porosity o Crucible stand for 6/12 crucibles o 2 crucible holders o 2 nos. each of acid tank, alkali tank, NDS tank, ADS tank • In case of filter bag system, the following accessories must be essentially quoted for o Heat sealer for filter bags; marker acetone resident block. o 12 nos. of glass spacer; drip tray; complete fiber bag incineration module along with 12 nos. of quartz crucible;

	tubing connection set; automatic alpha amylase dosing unit; and 12 place sample carousels. • Should be supplied with Certified Reference Material. Enzymes and all other reagents for 100 analysis.
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable UPS/Stabilizer as required for functioning of the Equipment
Quality Requirement	Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. • Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This

	amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

5. AUTOMATIC FAT ANALYZER	
Application: It is used for analysis of total fat content of food samples. It is based on the Soxhlet extraction principle and all functions as soaking; extraction, leaching, heating, condensation and solvent recovery are automated for safe operation. Several samples can be analyzed at the same time.	
Specification	**Requirement**
Function	The system must be capable of quantitative separation of total fats from food, feed etc.
Sample Positions	≥ 6
Measuring Range	0.1 – 100 % fat
Sample Volume (Size)	0.5 to 15 gm or more
Accuracy	± 1%
Solvent Recovery	≥75%
Temperature	100°C– 280°C or better
Other Features	• Shall be completely microprocessor based, fully automatic boiling, rinsing, drying, recovery, lifting of thimbles to cooling position and shut-down • User interface for upgradation of software • Shall be based on official 'RANDALL' method accepted by AOAC; • System must have capability to perform un-attended operation and must be programmable; • Should be provided with suitable solvent recovery system.
Safety Features and alarms	Automatic door lock and sealing during extraction. Automatic over- temp. Control/protection facility. Equivalent or ATEX classified components for internal exposed valves, IP 65 for other internal electronics, IP55 for Liquid and Dust protection, Pressurized electronics cabinet.
Material	All material in contact with solvents should be PTFE or suitable high- grade material The material of construction of equipment should be Epoxy painted stainless-steel structure to prevent corrosion or other corrosion free material
Accessories to be supplied	The system should be supplied with at least • 12 glass/aluminium extraction cups (preferably ≥ 150 ml.), • 24 dozen of suitable cellulose thimbles (preferably 33 Ø x 80 mm) or Filter Bags, at least 6 viton seals, • 1 sample tray, • 1 boiling stones, 1 cup stand and 1 recovery flask
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed

Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least) or CAMC
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is

	provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

6. AUTOMATIC PROTEIN ANALYSER	
Application: Kjeldhal method is used to determine organic nitrogen and protein contents in food samples. Automatic Kjeldhal protein analyzers are space saving and have distillation and digestion units combined together.	
Specification	**Requirement**
Digestion and distillation unit	Should be combined unit with all units from the same manufacturer and consist of Digestion unit, Distillation unit, Scrubber and Auto titrator
Digester	• Tube holding capacity: ≥ 20 • Temperature: ambient to 450˚C • Temperature Stability: + 1°C • Digestion Time range: 1 - 999 minutes or more • Should have programmable time & temperature ramping and audible alarms. • Should be provided with automatic motorized lifting of tubes from the heating unit.
Accessories for digester	• Exhaust unit, • Rack, stand, lid, • 40 nos. of digestion tubes ≥ 250 ml. • and all other required accessories for standalone operation of the digester
Scrubber system	i. The material of construction of the scrubber should be of high endurance materials like borosilicate glass or high-quality stainless steel. Auto Start from Digestion system ii. Cleaning shall include condensation, neutralization, adsorption and redox reactions to maintain efficiency of the equipment iii. Suction should be regulated/ adjustable to achieve efficient digestion. iv. All supplied reagent containers must be ≥ 2 L. capacities and must be made of high-quality borosilicate glass.
Automated Distillation and Titration Unit	1. Should be completely programmable for all controls like cooling water, dilution water, sodium hydroxide, receiver solution automatic calculation, automatic emptying of tube, titration vessel, etc. 2. Should have built-in colorimetric /Potentiometric titration system and allow use of a wide range of indicators. 3. Should have possibility for bypassing automatic titration system to allow manual titration 4. Should have ≥ 7” color touch screen LED/LCD/VFD display 5. Nitrogen measurement range: 0.1 - 200 mg or more 6. Recovery: ≥ 99.5%. 7. Should be provided with burette having ≥ 30 ml volume and must have possibility of automatic refilling during analysis Minimum dispensing volume: 2 - 3 µl 8. Reproducibility: 1% of RSD 9. Automatic waste removal via tube drainage after distillation 10. The system should be able to store the recorded data and must have facility for downloading the same using an USB port or through Wi-Fi or connectivity for LIMS

	11. Additionally, it should be possible for transferring weights and retrieving data using suitable software which is compliant to traceability. 12. The system should have safety sensors and audible warning systems 13. Should be provided with exchangeable splash head to reduce carry-over effects 14. The system should be provided with suitable password protection to prevent tampering of programmes and data. 15. The system must be compliant to ISO 17025:2017 16. The system shall have the possibility to track performance of the system and warns if analysis results changes over time. It is desirable to have component traceability feature in the system for effective maintenance of the system. 17. The instrument shall be delivered with a Verification Test document that certifies that instrument has been performance tested in factory (confirming analysis performance). 18. The systems should be supplied with Kjeltabs (5000 nos.) or equivalent, 4 tanks of ≥ 20 L along with level sensors for each of them
Spares and Accessories	All chemicals and reagents for 200 runs
Reference standard	Certified Ammonium sulfate (100g)
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided Advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 year after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
UPS	Suitable on - line UPS (5 KVA) to support the instrument.
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies

IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

7. BOMB CALORIMETER	
Bomb calorimeter is required to calculate the total energy value of the food products	
Specifications	**Requirement**
Instrument	Fully Automatic Bomb Calorimeter for rapid determination of Gross Calorific Value of food items.
Temperature resolution	0.0001^0C or Better
Reproducibility/ Repeatability	<0.1% RSD or better
Unit of measurement	CAL and KJ
Memory	1000 test or Higher
Pelletizer	Suitable for pelletizing food samples.
Sample weight	0.5 to 1.0 g, or better
Calories Energy Measurement Range	25 – 10000 Calories or more
Jacket Type	Isoperibol, water jacket
Bomb Type	Removal bomb and bucket type
Bomb standards	Comply with ISI350 / ASTM E144
Network Interface	Suitable interfaces for PC, Printer & Balance with USB type port.
Oxygen filling	Automatic
Calculation	Provision for correction facilities due to moisture Fibre, spike weight, Ash for further calculation of Gross Calorific Value.
Calibration Standards	NIST traceable calibration standards
Oxygen cylinder	Oxygen Cylinder 2 nos Cylinder regulator with adapter for filling the bomb – 1 no
Accessories	• Ignition wire – Additional 10 Nos • Cotton thread – 1000 Pcs • Combustion crucible – 25 Pcs • Bomb – Additional 3 nos • NIST certified Benzoic for calibration • Any other accessories required for analysis of food samples.
Training	The supplier shall provide on – site comprehensive training for scientific personnel operating the system and support services with the system.
Warranty	• Minimum 2 years warranty should be provided starting from date of satisfactory and faultless functioning of the equipment at the respective laboratory premises. • Comprehensive Maintenance Contract (CMC) Service for 3 years, after expiry of standard Warranty should be quoted. • Annual calibration of the equipment shall be a part of the CMC. It shall also be mandatory to perform calibration after every major repair/breakdown.
Operating manuals, service manuals, other	Should provide 2 sets (hardcopy and soft-copy) of: • User, technical and maintenance manuals to be supplied in English language along with machine diagrams;

manuals	• List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Compliance statement	The quote should also include a compliance statement vis- à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

8. CONDUCTIVITY AND TDS METER	
Application: The instrument is used to measure conductivity, total dissolved solids (TDS) and temperature of the solution.	
Specification	**Requirement**
Range	Conductivity: 0 µS/cm - 200 mS/cm; TDS: 0 - 200 g/L or ppt; Temperature: 0 - 100 °C
Resolution	Conductivity: 0.01µs/cm TDS: 0.01 mg/L or ppm to 0.1 µg/L or ppt; Temperature: 0.1 °C
Accuracy	Conductivity: ±1% full-scale; TDS: ±1% full-scale; Temperature: ± 0.5 °C
Calibration	Calibration by certified reference material traceable to SI units or ISO 17034.
Ready Indicator	Should inform when readings are stable
Selectable Cell Constant	Yes
Auto-Ranging	Across 5 Conductivity and TDS ranges Up to 5-point push button Calibration
Non-Volatile Memory	Shall hold up to 100 data points
Integral Electrode Holder	Yes
USB port	Yes
Display	LED
Additional Requirements	Conductivity calibration and verification standards that is traceable to certified international standard SRM NIST. Calibration certificate and inspection
Accessories	Electrode holder One spare electrode
Operating manuals, service manuals, other manuals	Should provide • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs should be adequately displayed
Warranty	At least for 2 year for electrode extendable up to 3 year on meter
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery back-up	Suitable rechargeable battery

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. • Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

9. DIGITAL BUTYRO REFRACTOMETER	
Application: It is an automated small instrument used for measuring refractive index of animal and vegetable fats and oils.	
Specification	**Requirement**
Function	Checking purity and adulteration of fats and oils
Features	Automated Operating system with LCD/LED screen directly without manual alignment can connect PC with RS232 interface; The required data to be displayed on the screen, including: the date, temperature, refractive index, concentration, and amended in accordance with the current temperature
Measurement Range	Concentration 0;95% Refractive Index 1.2800－1.7000
Automatic Temperature Control	Through Peltier
Concentration	0 - 80%
Resolution	Butyro 0.1% RI 0.0001
Measurement Accuracy	Butyro ±0.5% (at 40˚C) RI ±0.0003 (at 40˚C)
Precision (Reproducibility)	Butyro ± 0.05 RI ± 0.0001
Measurement Temperature	10˚C to 65˚C or better
Temperature Accuracy	±0.1˚C
Ambient Temperature Sample	10 to 40˚C
Response Time	≤5 sec
Sample Volume	≤2 ml
Certified Reference Materials	Refractive Index Certified Reference Materials (CRMs) Certified reference material used for calibration and verification for refractive index at 25^{O}C. (minimum volume 25 mL)
Operating manuals, service manuals, other manuals	Should provide • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided Advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2-years, extendable by 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Service Support	Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer

Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached.
UPS	UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010- 2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies • All Calibration certificate from ISO-17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period.

	v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

10. FLASH POINT APPARATUS (PENSKY-MARTENS)	
Application: Used to measure flash point of oils and fats by using Pensky-Martens Closed Cup method for determining the quality of oils and fats and contamination.	
Specification	**Requirement**
Design Ignition	Must designed in strict accordance with the test method ASTM D93, Method A and B. Automatic movement of head for closing and opening of the cup Microprocessor controlled unit with digital easy to read display of the results
Ignition	Electric ignition and should also provide an automatic reignition facility Electric Ignitor should be encapsulated
Detection	Thermal detection (with metal sample temperature probe) of the flash to eliminate interference from water or silicone containing compound.
Cooling	Facility for built-in cooling connection
Measuring Range	Flash point Ambient to 350 °C or more
Heating System	Heat rate: 0.5 °C to 12 °C/min. Heating should be microprocessor controlled at the specified rate; the ignitor is activated and dipped at precisely the correct temperature and frequency
Temperature Measurement	Rugged metal and intelligent Pt 100 probe with built-in calibration, min 5 calibration points
Temperature calibration	Resistance check box for temperature calibration with calibration certificate from ISO 17025/NABL accredited laboratory
Sample Stirrer	Automatic stirrer: test method or user-defined from 0 rpm to 250 rpm or more
Barometric Pressure Sensor	Built-in sensor for automatic correction of flash point for standard barometric pressure vis-à-vis with final result. Pressure units: Pa, kPa, bar, mbar, psi, mm Hg (Torr) etc.
User Interface	Touchscreen, alphanumeric data input, bar code reader, HDMI
Safety device	Safety device for fire protection with alarm
Power Supply	AC 100 V to 240 V, 50/60 Hz
Number of LED indicators available to indicate Power input	1
DC Voltmeter Range	0-30 Volt
DC ammeter Range	0-50 in milli Ampere
Operating manuals, service manuals, other manuals	Should provide • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed

Warranty	Warranty for 2 years, extendable by 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any

	breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

11. FLAME PHOTOMETER	
Application: The flame photometer is used for qualitative and quantitative determination of several cations, especially for metals that are easily excited to higher energy levels at flame temperature. These metals include Na^+, K^+, Ca^{2+}, Ba^{2+}, and Li^{2+}.	
Specification	**Requirement**
Measuring Range	Na^+: 0 to 199.9 ppm K^+:0 to 199.9 ppm Ca^{2+} :0-99.9 ppm Li^{2+}: 0 to 9.99 ppm
Sensitivity	Na^+= 0.1 ppm K^+ = 0.1 ppm
Specificity	less than 0.5% interference when concentrations are equal to test sample concentrations
Gas Control	Adjustable with knobs
Ignition System	Auto Ignition System
Flame Failure	Auto detection
Gas Cut off	Automatic
Reproducibility	Less than 1% coefficient of variation for 20 consecutive samples using 10 ppm Na set as maximum standard
Linearity	Less than 1%
Display	LED, 12.5 mm (1/2")
Fuel supply	High-grade propane/butane mixture regulated at approximately 30 psi
Air supply	6 L/min at 12 psi; oil and moisture free
Recorder	output 0.05 to 5 V (switchable)
Operating manuals, service manuals, other manuals	Should provide • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration Standard	Must supply traceable standard solutions for Na^+, K^+ and Ca^{2+}
Warranty	Warranted for 2 year, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Stabilizer	Suitable Stabilizer as required for functioning of the equipment

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier. • Equipment should be FDA / CE certified or equivalent standard of repute. It should be ISO 9001:2000 or other equivalent • All calibration certificates must be from ISO 17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis- à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

12. GAS CHROMATOGRAPH	
With FLAME IONISATION DETECTOR (FID) and ELECTRON CAPTURE (ECD) and NITROGEN PHOSPHORUS(NPD) DETECTORS	
Application: Gas chromatography (GC) is a key analytical technique in the food and beverage analysis. It enables complex organic substances to be separated in a gaseous phase and identified quickly. Used for pesticide, fatty acid composition, trans fat analysis of foods	
Note: The laboratories can choose from among the three detectors described based on the analytical application. It is not binding that all the detectors must be obtained.	
Requirements	**Specifications**
System	Gas chromatograph with capability of operating concurrently with two injectors and two detectors or better. The system should be quoted with all accessories required to make it fully operational and any other item required for stated applications be quoted as optional.
Oven	• Up to 450 ^{o}C, with 50 ^{o}C/min ramps 8 or more • Cool-down time from 450 ^{o}C to 50^{o}C within 5 minutes or better • Should be able to accommodate two or more injectors and two or more detectors • Automatic leak test of system
Pneumatic Controls	0-100 psi or better, All Electronic Pneumatic Controls with 0.1 psi precision
Injector (2 or more)	Should be capable of large volume injection Temperature ramped split less, Split and Cold on-column modes or pressure based technology ≥450 ^{O}C max. and ≥2 ramps or better. Multimode/PTV/ PSSI with 150 µL or better Injection Volume capability with complete solvent vaporizer system or Equivalent. Injector must be able to operate with capillary & wide bore columns System should have back-flushing capability.
Autosampler (Liquid)	• Robust Liquid auto sampler capable of injecting ≥100 samples or better with syringe • Must allow installation and automation of suitable syringe featuring volumes from 0.1 to 50 µL or more. • Must be able to achieve combined multiple solvent rinsing with up to 4 different solvents.
Head space auto sampler	• With a capacity ≥35 vials or better that support 10/20/22/ml or better vial capacity with Pneumatic control • Incubation Oven Temperature Range 50 to 200 °C in 1 °C steps • Syringe/needle or Valve & Loop Temperature 50 °C to 150 °C in 1°C steps • Incubation Oven Capacity of 6 -12 vials or better. • Headspace sampler should have an RSD < 2%.
Detectors	The GC must have complete integrated control of all parameters for respective detectors: FID/ ECD/ NPD. Detector must be independently controlled and operational for maximum sensitivity

Flame Ionization Detector (FID)	Linear range: better than 10^7 Minimum detectable amount with/without makeup gases: 1.5 pg C/sec or <3 pg C/sec or better with Octane. Operating temperature limits: 450^oC Acquisition rate 50 Hz or more
Electron Capture Detector (ECD)	• Linear dynamic range: better than 10^4 • Complete with ^{63}Ni source and low voltage heaters. • Minimum detectable amount: Less than 10 fg of lindane or < 0.05 pg perchloroethylene. • Operating temperature limits: 400^oC
Nitrogen Phosphorus Detector	• Minimum detectable amount: 5.10^{-13} g N/sec and 5.10^{-14} g P/sec • Linear dynamic range: better than 10^4 • Operating temperature limits: 400 °C or better with standard jet
Gas Supplies	Required High purity Gas cylinders (2 No. Each) with regulators Nitrogen, Helium. Hydrogen & Zero Air
Software and Hardware (Single Point Control Of Software & Hardware)	
Software	Complete system and software configuration must be 21 CFR Part 11 compliant. Software: Windows Based software with multitasking and capability.
	Software update upto five years
Communication Hardware:	Latest Factory set, branded system with 22-23" Full HD Monitor with Printer - B/W - duplex - laser - Legal, A4 - 1200 dpi x 1200 dpi - up to 21 ppm – capacity with Network Card and Bluetooth facility.
Application Support	The Application support for stated applications required during method development and validations.
Pre-Installation Requirements	Provide all PIR of the system.
Other requisites for GC with ECD/FID/NPD	Automatic Change Over Manifold for all gas lines including carrier gas Complete Gas Purification Panel with fittings & installation of all gases Renewable in Line Gas Purification System Renewable gas purifier cartridge, Spare Set Gas clean filters/Traps (6 No.)
Septa for injectors	Nonstick, Low bleed, high puncture tolerance and Max. Temp 400 ^oC (*for each injector*). (400 No.)
Liners	Provide all Suitable injector liners required for the system quoted (20 No.)
Ferrules and Nuts	50 No. (for each column end and other interfaces as applicable), 50 No. for GC with ECD, NPD, FID
Columns for GC Applications	Pesticide column (30 m x 0.250mm x 0.25µm (5MS (95% dimethyl-, 5% diphenyl-polysiloxane / 1MS (100% dimethyl polysiloxane or equivalent) (02 no.) Column for Fatty Acid Profiling with main concern of Trans Fatty Acid Application (02 No.) Column for Cholesterol Application (02 No.) Stationary phase:

	95% dimethyl-, 5% diphenyl-polysiloxane (30 m x 0.250mm x 0.25µm),
Vials, caps and tool for autosampler *(Only Compatible sizes should be supplied)*	• 2000 No. each Vial sets (1, 2 mL, Crimp type, Amber and Clear glass) • 200 No. Vials (10,20ml Crimp type with cap & septa) • 1000 No. 300/500 µL Recovery vials • 6000 No. Septa PTFE/Silicone (for 1, 2 mL Vials) • 6000 No. Septa PTFE/Silicone (for 10, 20 mL Headspace Vials) • Ergonomic Crimping Tools for different vial types • Ergonomic Decapping Tools for different vial types • 10 No. each Storage Racks for (for 1, 2 mL Vials) • Head Space vials 10,20 ml capacity (500no. each)
Autosampler Syringe	Suitable syringes for quoted autosampler (4 Nos) Suitable Headspace syringe /valve/loop (4 Nos)
Sample Preparation *(Water & Food)*	• QuEChERS Kits for Pesticides and Herbicides in following Matrices: • Matrices with high fat (1000 No.) • Matrices with high Water content and (1000 No.) • Matrices with high pigmented (1000 No.) • SPE cartridges for water (1000 No.)
Tools and Kits	Septa Removing tool Tubing Cutter with rotating diamond blade for column Tubing Cutter for stainless steel tubing (1/16- & 1/8-inch tubing) Tubing Cutter for Plastic tubing with spare blade set
Miscellaneous	Consumables required for each detector must be provided
Reference Standards	NIST traceable standards for all Fatty Acids including Trans fatty acids, Cholesterol, plant sterols listed under various standards under FSSRules and Regulations 2011
Operating manuals, service manuals, other manuals	Should provide • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2-year, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached.

UPS	Suitable on - line UPS (10 KVA) to support the instrument for 60 mins.
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier. All calibration certificates must be from ISO 17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. • Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down

	time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

13. HIGH PERFORMANCE LIQUID CHROMATOGRAPH (HPLC) With PHOTODIODE ARRAY (PDA), FLUORESCENCE (FLD) AND REFRACTIVE INDEX DETECTOR(RID)	
Application: High-performance liquid chromatography (HPLC) is used to separate, identify, and quantify each component in a mixture. In food analysis it is used for analysis of food colors, food additive, vitamins, sugars amino acids, triglycerides etc. It is also used to estimate aflatoxin.	
A complete HPLC comprising of a 1) Quaternary solvent system 2) Autosampler, 3) Column Oven, 4) Columns C18 & C8 RP Columns and 5) Detectors (PDA, FLD and RI). The complete system should be controlled by single software. The system should have the capability to operate the column range from 10 µm to sub 2.5 µm particles and any other column chemistry *Note: All units must be from the same manufacturer. Technical bids with compatible modules from another manufacturer will not be evaluated*	
1. Quaternary Gradient System with Online Degasser.	
Pressure operating range	8500 psi or better
Flow Rate Range:	Programmable 0.01 to 2 ml/ min in 0.01 ml/min increments
Flow Precision	±0.1% RSD or below
Flow Rate Accuracy	±1%
Delay Volume	< 1100 µl
Eluent Degassing	Online membrane Degasser for all channels
Gradient Mixer	• Quaternary mixing & gradient capability using suitable proportionate valve) • Plunger Seal Wash Integral/Gradient Profiles which include gradient curves: linear, step, concave, and convex • Composition Precision 0.20% RSD or +/- 0.04 min SD, whichever is greater, based on retention time
Solvent Setting Range	4 solvents setting range:0-100% with 0.1% step
Diagnostic Features	Error detection and display, Leak detection & safe leak handling
PDA Detector	
Wavelength range	190-750 nm with inbuilt Holmium oxide filter
Spectral resolution	1.2 nm or better per photodiode with a Total of 1024 photodiodes, digital and optical (3D modes)
Bandwidth	<5 nm or better
Linearity range	<5% at 2 AU, 257 nm
Baseline noise	8.0 X 10^{-5} AU at 254 nm or better
Drift	<1.0x 10^{-3} AU/h at 254 nm
Suitable peak purity software, Auto threshold for peak purity	
RI DETECTOR	
Refractive Index Range	1.00 to 1.75 RIU
Noise Level	± 2.5 x 10^{-9} RIU
Drift	1 x 10^{-7} RIU/hr
Cell Volume	Approximately 10 µL
Temperature Control	Temp. controlled Flow cell unit
Temperature Operating Range	5º below 25 ºC to 50ºC.
Fluorescence Detector	

Light Source	Continuous Xenon lamp
Excitation Wavelength	Range 200-850 nm
Emission Wavelength	Range 220-700 nm or better
Spectral bandwidth	15-20 nm both in the excitation and emission sides
Wavelength accuracy	should be +/- 2 nm
Repeatability	should be $\pm$ 0.2nm
Sensitivity (Single λ mode)	S/N > 1000 (Raman Spectrum of H_2O) as per ASTM Method
Pressure	limit up to 500 psi
Column Oven with preheating capability	
Temperature range	10 to 90° C
For column length	Must accommodate up to 300 mm length columns
No of Columns accommodated	2 or more
Temperature Stability	±0.1 ºC of set temperature
Cooling system	Peltier based or equivalent technology
Autosampler	
Injection Mode	Total vol. Inj / Variable Inj method
Injection Volume Range	0.1-100 µl (Standard)
Sample Capacity	>80 x 2 ml vials or more
Injection Precision	<0.5% RSD or better
Carry over	0.005% from previous injection
Tray Temperature Operating Range	4 - 40 º C or more with ±0.5 ºC accuracy
Accessories	
HPLC Columns	One each of C8 = 250 × 4.6 × 5µm C18 = 250 × 4.6 × 5µm Cyano = 250 × 4.6 ×5µm. Amino = 250 × 4.6 × 5µm Phenyl = 250 × 4.6 ×5µm. Silica = 250 × 4.6 × 5µm. All columns must be supplied with respective guard column and holder
Accessories to be supplied	• Sample Vials 100 numbers with 1.5 ml or greater. • Stainless Steel Ultra Sonic bath with the capacity of 5 L or more, with Time setting (min) 1-30min or continuous operation with LED and Push button (Should be IP 33 Protection class) for sonication of spare parts as well as solvents. • Mobile phase filter assembly (2 L) for aqueous and organic solvent: Aqueous and organic solvent compatible membranes 0.22 microns 100 numbers each • Oil free vacuum pump (1 no.) with 4 bar pressures or better should be Neoprene diaphragm based. • Fittings, Frits, ferules and Tubing's • Tubing cutter (2 no.) • Solvent bottles (12 no. each 1000 ml capacity) • Solvent filters (Glass & SS both, 08 no. each) • Compatible Manual syringes -10 µl, 20 µl, 50 µl (02 no. each)

	• Standards for HPLC Calibration for PDA, RI and Fluorescence detector • Spare lamps for each detector • Consumables required for each detector must be provided
Software and Hardware	Complete system and software configuration must be 21 CFR Part 11 compliant. Software: Database version software with multitasking and capable of performing the following functions: Control the system, acquire, store, process and reproduce the data. It must be able to control all the devices from same software
PC with Printer	Latest Factory set, branded system with 22-23" Full HD Monitor with licensed OSs, MS office standard version and Antivirus for 3 year with Printer - B/W - duplex - laser - Legal, A4 - 1200 dpi x 1200 dpi - up to 21 ppm – capacity with Network Card and Bluetooth facility
Service Contract Clauses, Including Prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Supplier/ Manufacturer	Must be ISO certified for quality
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of: - • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation, if any.; Certificate of calibration and inspection
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2 years, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable true on - line UPS (10 KVA) to support the instrument back up for 60 mins.
Quality Requirement	Should be compliant with the requirements of FDA/CE/BIS • Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier.

IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

14. LOVIBOND TINTOMETER	
Application: It is a visual and automated color measuring instruments synonymous with accuracy in the measurement of color in edible oils, beverages & foodstuffs	
Specification	**Requirements**
Measuring principle	Visual, in terms of Lovibond® units
Modes	Transmittance, reflectance Range 0.1 - 79.9 Red, Yellow; 0.1 - 49.9 Blue; 0.1 - 3.9 Neutral
Resolution	0.1 Lovibond® unit
Optical system	11 glass-filled nylon racks containing a graduated range of Lovibond® color glasses
Viewing system	Fully adjustable, prismatic with integral blue filter for light standardization
Light source	2 x 12 Volt, 10-Watt tungsten halogen lamp Illuminant approximates to daylight
Path length	Up to 153 mm (6”)
Power pack	12 Volt AC, switchable to suit 220/110 Volt supply Approvals CE Instrument housing Fabricated sheet steel with a tough, textured paint finish
Accessories	Conformance filters and certified colour reference solutions representing a range of Lovibond® colours, for quick and simple quality control checks on instruments and operators.
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	UPS/Stabilizer as required for functioning of the equipment
Validation	For validation vendor should having own capability with their own company trained service engineer to perform validation No third part validation will be entertained. One validation at the time of installation should be done by company personnel

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If

	downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

15. pH METER	
Application For food analysis, pH adjustment of buffers, solvents etc. with comprehensive range of features and functions, making it suitable for general laboratory, QC and GLP based applications	
Specifications	**Requirement**
Unit	Consisting of Tri-combination pH/ATC electrode with an electrode holder/arm with smooth movement and protection cover
Working pH Range	0 – 14 pH
pH resolution	± 0.01 pH
Mv	Range 0 - ± 1999 Accuracy± 1mV Resolution 1 mV
Temperature Compensation	0 to 100 ° C with ATC
Temperature	Range -10 to +105°C Resolution 0.1°C Accuracy ±0.5°C ATC range 0 to 100°
Calibration Points	• Should have 3 stage calibration with auto buffer recognition • NIST traceable buffer set 500 ml each (pH 4.0, 7.0 & 9.0).
Alarm	Calibration reminder interval (1 to 999hrs)
Temperature Compensation	Automatic
Display	Backlit blue LCD with operation icon digital display with 0.001 pH unit readability
Accessories	• Extra Electrode • Standard buffer solution (pH 4.0, 7.0, 9.0 x 500ml for each bottle) • Standard electrode holder • AC /DC Adaptor.
Power	9V DC
Data storage& Output	Data storage facility and record maximum and minimum value. RS.232C output and supplies Data connector cable.
Documents Certificates Performance and safety standards (specific to the device type); Local and/or international	• Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Complete with IQ, OQ, PQ, Documents, Operations and Maintenance manuals
Supplier/ Manufacturer	Must be ISO certified for quality
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached.

Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of: • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided • Certificate of calibration and inspection
Operation and maintenance training	The supplier will have to carry out successful installation at our laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for scientific personnel operating the system and support services till customer satisfaction with the system.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
Compliance statement	The quote should also include a compliance statement vis- à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

16. TURBIDITY METER	
Application: Turbidity meter is used for the detection of turbidity of liquids and aqueous solutions	
Specification	**Requirement**
Type	Bench Top
Range	0-1000 NTU
Principle of Operation	Nephelometric
Automatic Range Selection	0.01 to 19.99 NTU, 20.0 to 99.9 NTU, 100 to 1000 NTU
Accuracy	± 2% of reading ± 1 digit for 0 – 500 NTU ±3% of reading ±1 digit for 501 – 1000 NTU
Response Time	Less than 6 seconds
Calibration	4 points
Calibration Kit	set 3 sample vials
Resolution	0.01 NTU (0 to 19.99 NTU), 0.1 NTU (20 to 99.9 NTU), 1 NTU (100 to 1000 NTU)
Display	Digital LED
Light Source	Tungsten halogen Lamp/ Infra-Red Emitting diode
Detector	Photo Diode
Connectivity	RS232 interface
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 year after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	Instrument should have all the standard accessories like silicone oil, oiling cloth, filter assembly, sample cells with caps, turbidity standardization kit, Calibration kit, NIST traceable standard solutions And dust cover at the time of supply
UPS	UPS/Stabilizer as required for functioning of the equipment

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent • BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit. • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

17. UV-VISIBLE SPECTROPHOTOMETER	
Application UV-VIS spectrophotometer is the workhorse of the laboratory used in spectrophotometric and colorimetric analysis of analytes, food colors, enzyme assay, hydroxymethyl furfural, coloring and bitter principles of saffron etc.	
Specifications	**Requirement**
System	A fully automated PC Controlled spectrophotometer with double beam optics with pre-programmed applications using conventional quartz / glass cuvettes with all the required accessories.
Operation keys	• Instrument should operate immediately after switch on with no warming up time • Should be automatically programmed with from PC key board • Capable to store method with analysis:> 100 method • programs on the instrument or PC > 1000 results with data, evaluation results and used parameters
Optical Design	• Double Beam with sample and reference cuvette positions; Czerny-Turner equivalent Monochromatic • /Holographic OR equivalent grating with sealed optics • Reference Compartment Should accommodate cells up to 10 mm path length as standard feature
Light Source	• Halogen lamp for Visible range • Deuterium Lamp for UV range, light source should be auto automatically selected as per wavelength required.
Detector	Silicon Photodiode dual detector/PMT
Scan Ordinate Modes	Absorbance, % Transmittance, % Reflectance
Resolution	0.1nm or better.
Wavelength Range	190 –1100 nm
Wavelength Accuracy	± 0.3 nm or better for entire range
Wavelength Repeatability	± 0.1nm or better
Scanning Speed	Selectable Variable wavelength scan rate 10nm/min to 2500 nm/min or
Spectral Bandwidth	Variable (0.5/1/2/4 or 5) nm
Photometric Range	Absorbance = -3.0 to 3.0 Abs or better.
Photometric Accuracy	With Neutral Glass filter @ 546nm : ± 0.003A
Stray Light	Max. 0.05% (220 nm NaI) or better, Max. 0.05% (340,370 nm NaNO2) or better Max. 1% (198 nm KCI) or better
Noise	0.00005 Abs RMS (500nm) or better
Base line stability	< 0.0005 A/hr (500 nm, 1-hour warm-up)
Baseline flatness	± 0.0005 Abs or better
Application Software	Compatible Software should be user friendly & simple for data handling with feature like easy to use report publisher, online help and answer wizard, GLP & audit trail and fully compatible with Windows. System built in features such as real time display of concentration, time scan, photometric mode, single/multi-wavelength, capability for event recording (e.g., addition of

	reagents) Software should have built in a. Methods: Absorbance with one or more wavelengths, Scans, Nucleic acids, Proteins, OD 600, Evaluation: via factor, standard and calibration curve Dual wavelength with subtraction and division evaluation Method dependent evaluation: Absorbance, concentration via factor and standard Concentration via standard series using Linear regression, Nonlinear regression with 2nd and 3rd degree polynomials Spline analysis, Linear interpolation (point to point evaluation) Absorbance allocation via subtraction and division Ratio 260/280, 260/230, Molar concentration and total yield for nucleic acids. The software should be 21CFR part 11 compliant.
Accessories and spares	• One pair each of of 0.5, 1 and 3-ml quartz cuvettes 10 mm path length • One pair each of of 0.5, 1, and 3 ml glass cuvettes 10 mm path length • Cuvette holder • Deuterium Lamp • Halogen lamp • Suitable Certified Standards for Validation including Holmium oxide glass filters for wavelength calibration & NIST traceable NIST traceable • NIST traceable Potassium dichromate
Computer and printer	Latest configuration factory set branded PC system with 22-23'' Full HD Monitor with printer –B/W – duplex- laser-legal, A4 - 1200dpi-up to 21 ppm –capacity with network Card
UPS	Suitable UPS with 60 mins backup power
Calibration	Certificate from an ISO 17025 accredited lab spectral calibration.
Compliance	IQ/OQ/PQ of instrument and Software should be provided along with document
Operation and training component	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be FDA/CE/BIS approved product. • Manufacturer and Supplier should have ISO 13485 certification. • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard)

Quality requirement	Should be compliant with the requirements of FDA/CE/BIS Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
Recommendations or warnings	Any warning signs would be adequately displayed
Warranty	Warranted for 3 years after satisfactory installation and working excluding consumable parts and accessories.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation, if any.; • Certificate of calibration and inspection
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any

	breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

18. SPECTROFLUOROMETER	
Application: Fluorescent techniques coupled with multivariate classification methods have been exploited to classify or discriminate foods according to different criteria. An important application is the assessment of food authenticity and adulteration. Important applications for fluorescence in edible oils studies include: authentication of virgin olive oils, discrimination between their different quality grades and geographical origins, and detection of adulteration with low-grade olive oils or other vegetable oils	
Specification	**Requirement**
Design	Modular, open-architecture spectrofluorometer with ozone free xenon lamp and power supply. Capable of automatic acquisition of corrected emission and excitation spectra, polarization spectra, synchronous luminescence spectra, kinetic studies, temperature dependent studies.
Excitation source	High power Xenon arc lamp with 150W power and 2,000hr lifespan
Spectrometer - Excitation:	Czerny-Turner monochromator, focal length 300 mm or better, accuracy ±0.3 nm or better, software controlled triple grating turret with grating 1200 lines/mm, around 300 nm blaze for UV-VIS range Excitation range: 250-900 nm, optimized in the UV
Spectrometer - Emission	Czerny-Turner monochromator, focal length 300 mm or better, accuracy ±0.3 nm or better, software controlled triple grating turret with grating 1200 lines/mm, around 400 nm blaze for UV-VIS range Emission range: 250-900 nm, optimized in the Visible
Sample Compartment	• Lid activated emission port shutter • Large enough to accommodate Polarizer, Filter etc. • Peltier thermostatted single cell holder with magnetic stirrer, - 5 ºC to 100 ºC, • Temp. Ramp: 0.1 ºC /min to 20.0 ºC /min. Peltier temperature must be software controlled
Detectors	• Should allow simultaneous UV-VIS absorbance and fluorescence recording • Photon counting detection technique Analog signal output must be available • Silicon photodiode reference detector (to monitor excitation source fluctuations) • Red sensitive PMT for UV-VIS (up to 850 nm or better)
Sensitivity	Signal-to-Noise ratio for Raman band of water 4000:1 or better
Computer hardware and software	Suitable computer workstation and all interfacing hardware and software (should be easily upgradable) for instrument control, data control, data acquisition, data storage and data processing for steady-state and time resolved. Multi-user

Essential Accessories System	Absorbance Measurement Accessory Filter Holder with set of 12 slots and 6 filters in UV-VIS range Quartz Cuvette open top with lid, 10mm path length, volume 3 ml --- 4 nos. Computer with latest configuration to run total system
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail for IC. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier will have to carry out successful installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer Satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS/Stabilizer	Suitable UPS as required for functioning of the equipment with 60 min back up
Quality Requirement	Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies

IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also, unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

19. ELISA READER WITH PLATE WASHER	
Application: ELISA readers detect and process and quantitate biological and chemical data using absorbance (ELISAs, enzyme activity, and nucleic acid and protein quantification), luminescence, and fluorescence detection modes, in the wells of a plate usually 96 or 384 plates	
Specifications	**Requirements**
ELISA Microplate Reader	
Light Source	Quartz-halogen lamp 6V/10W
Wavelength	Absorbance 230-750 nm-, Accuracy ±1nm Fluorescence Ex 230 – 850 nm, Em 280 – 850 nm Accuracy < ± 2 nm
Filters	8- position filter wheel, the instrument is delivered with the following standard filters installed: 405nm, 450nm, 620nm and 650nm
Resolution	0.001 Abs
Display	High contrast color display (480 x 272 dots)
Internal Memory	At least up to 99 assay protocols and 100 test results, 96- well plates
Incubator (Optional)	Temperature range from ambient +4^{o} C up to 50^{o} C
Accuracy(405nm)	± 1% (0-3Abs) or ± 0.003 Abs, whichever is greater
Communication	USB for computer connection USB for memory stick position for data export USB for external printer
Mains Input	100-240V(50/60Hz) with IVD specifications
Capability	Capability to read flat- , U- , or V- bottom microplates, 6 / 12 / 24 /48 / 96 wells and cuvettes
Power Supply	210-240V/50-60 Hz
Detectors	Fluorescence, UV and Visible, Luminescence
Temperature control	Ambient +5 °C to 45°C
Calibration plate	96-well calibration plate must be calibrated for the wavelength (e.g., 630 nm, 650 nm, 420 nm, 450 nm).
Calibration	Calibration certificate from ISO 17025, NABL accredited laboratory
ELISA Microplate Washer	
Function	Fully automatic plate washer With IVD specifications
Compatible	With ELISA reader supplied (as per model)
Capability	Washing of 96 well microplates and strips, with flat, round, or “V” bottom well
Bottle	With non-pressurized bottle to maintain biosafety Wash, rinse and waste (volume 4-6 L)
Residual volume	< 2 µl
Dispensing volume	50-400 µl for 96 well plate
Plate sensor	Should have the provision
Data Transfer	USB Port Number of wash protocols up to 99
Number of Wash buffer bottles	One
Validation	For validation vendor should having it own capability with their own company trained service engineer to perform validation. No third part validation will be entertained. One validation at the time of installation should be done by company personnel.

Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 year after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
Accessories	Spare Lamps 2 Nos. Multichannel pipette (2 nos) with tips and calibration certificate should be provided.
List of Spares and Accessories	All spares and accessories for both ELISA reader and Plate washer along with part number must be listed
UPS back-up 30 mins	Branded compatible online UPS with at least 30 minutes backup
Certificates required	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer.

	iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

20. KARL FISCHER TITRATOR	
Application Also known as Moisture meter. Karl Fischer titration is widely used for direct analysis of water content in various foods, as a reliable and robust method. In food industry it is used for water content determination in fruit juices, honey, flour, noodles, chips, cocoa powder etc with water content less than 1%.	
Specifications	**Requirements**
General design	The instrument should be equipped with integral magnetic stirrer and inbuilt/external printer and RS232C/USB connector for balance interface and computer. The display panel and key pad should be attached with the main unit.
Titration Method	Coulometric Karl Fischer Titration
Measuring Range	10 µg to 100 mg water or better
Resolution/ Sensitivity	1.0 µg H_2O
Precision	± 3 µg in 10 µg-1000 µg range and 0.3 % (maximum) above 1.0 mg
Display of Unit for Moisture	ppm, µg, mg/kg, %.
End Point Detection	AC Polarisation Constant current Polarisation method
End Point Indication	Visual Display/ Print out/ Acoustic beep
Titration vessel	Low drift cell design with no grease or PTFE sleeves
Drift correction	Automatic Control
Maximum Titration Speed	1.0 mg H_2O/minute or better
Maximum Electrolysis Current	100 mA or better (Automatic electrolysis current control)
Start/End Delay Time	It should have option for Start/End Delay Time
Calculation Modes	w/w, w/dilution, volume/density, v/v
Method Memory	Yes
List of accessories to be supplied	• Titration Vessel 01 No. • Detector Electrode with Lead 01 No. • Generator Electrode (with Frit) with Lead. 01 No. Desiccant Tube and Cap 01 No. • Injection Septa (Pack Of 10) 01 No. Gas Tight Syringe 1.0ml 01 No. • Luer needle 17-gauge 01 No. Dust Cover 01 No. • Results Manager Software 01 No. Main Power Pack 01 No. • Fuse 05 No. • Karl Fischer Titration Reagent(s) 02 Sets NIST Calibration standard 02 No.
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.

Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration certificate	Calibration certificate from ISO17025 for Temperature and Relative humidity.
Warranty	2-year after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery backup	Suitable rechargeable battery
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.

Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

21. AUTO TITRATOR	
Application: The auto titrators are suitable for all of the titrations required in food analysis namely acid-base titrations, precipitation titrations as well as complexometric and redox titrations. Applications include Citric/tartaric acid in fruit drinks, calcium in milk, sulphur dioxide in wine, etc.	
Specifications	**Requirements**
Principle of operation	Volume determination by equivalence point and end point.
Instrument details	• Microprocessor controlled titration unit (vortex type) and control unit and shall also comprise the following: • 10 ml and 20 ml burette with tubing, connector & Teflon coated valve: 2 Nos each • Temperature sensor • Moisture filter • Glass dispensing tip • 150 ml. Glass beaker 4 Nos. • Stand for mounting all above items • Electrode for aqueous titration – pH combination • Reagent bottles • The automatic titrator shall be accompanied with the following accessories: • Electrode pH glass body combination • Electrode for argentometric / precipitation titration – silver pin combination • Electrode for redox titration – Platinum pin combination • Electrode for complexometric titration – silver pin combination glass with amalgamation.
Combine functionality	Offered auto titrator must have functionality for determination of pH and for performing aqueous titration, redox titration, argentometric / precipitation titration, complexometric titration and silver assay
mV range	± 2000 mV or higher
Accuracy	± 0.10 mV or better
Polarized sensor range	0 ± 3200 mV
Polarized sensor Resolution	0.10 mV or better
Burette resolution	1 µL
Fill and drain time	Burette for Fill and Drain Time : 20 s
Titration head	Manual stand with swiveling arm
Stirrer System	Instrument must have inbuilt magnetic stirrer which prevent vortex formation and enables better mixing for fast response of electrode
End point detection	Potentiometric and voltametric
Cut-off criteria	Volume, pH/mV and endpoint

Special feature	• Auto titrator should perform fast, reliable, and reproducible automated titrations. • Auto burette recognition • It should have a mode for performing automated calibrations program and save at least 100 user defined methods with password protection. • It should provide flexible pH, redox, and ion concentration titrations. The unit should also have feature of equivalence point titrations, preset pH or mV endpoint titrations. • Auto titrator should have minimized downtime with easily replaceable burettes, tubing, and dispensers. • Auto titrator should have a feature to leave unattended in running condition until titration is completed. • Provision to connect electrode with BNC connector and also for differential electrode
Memory	Auto titrator should have memory to store at least 100 titration data sets with date/time stamp, transferable to printer, computer, or USB drive.
Display	Minimum 7" touch screen display with LCD graphic display The display should clearly show online graph of titration trend and also the status of burette filling & dispensing
Report format	Parameters and results, Data table for mV, pH, mV/ml, and volume (µL) Titration curve mV v/s µL
Workstation	Computer latest model exclusive for use with Potentiometric Auto titrator to be provided with appropriate licensed software. Laser jet printer to be supplied.
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration certificate	Calibration certificate from ISO17025
Warranty	2-year after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit

	• Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery backup	Suitable rechargeable battery/Suitable rating UPS
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at

	the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

22. FT-IR WITH ATR & LIQUID CELL	
Application: Fourier Transform Infrared (FTIR) analysis is a spectroscopic technique that uses wavelengths between 2,500nm and 25,000nm (Infra-Red region). It is particularly useful for testing liquid samples, such as oil, milk and wine and it requires little or no sample preparation.	
Specifications	**Requirements**
General	Fully Computer Controlled Compact FT-IR system with universal sample compartment. System must incorporate an automated internal NIST Traceable Polystyrene film Sample module must be automatically identified • Should have latest digital signal processor • Indicator for operational source and laser
Wave number measurement range	at least 7,800 to 500 cm^{-1}
Wave number accuracy	within ± 0.01 cm^{-1} @ 2000 cm^{-1}
Resolution	≤ 0.5 cm^{-1}
Signal to noise ratio	(≤ 5 cm^{-1}, ≤ 1 min scan) ≥ 30,000: 1
Optical system	Single / Double beam Sealed and desiccated optics Temperature controlled and moisture / humidity resistant KBr optics
Light	High intensity long life ceramic source Standard interferometers and detectors
Instrument alignment	Instrument alignment and performance to be immune to minor mechanical disturbances Reliable calibration mechanism Auto subtraction of CO_2 and H_2O absorptions
Sample analysis	Provision for investigation of both solid and liquid samples
Sample holder	Standard sample cell holders for both liquid and solid samples
Accessories	• Variable temperature Sample cells / Jackets for solid samples – 2 nos • Variable temperature Sample Cells / Jackets (KBr windows) for liquid samples – 5 nos • Variable path length accessories (spacers) for liquid samples – 0.02 mm, 0.05 mm, 0.1 mm, 0.5 mm, 1 mm (2 sets of accessories for each path length) • Hydraulic Press with KBr die and Pellet Holder • Suitable Mortar Pestle (dia 5-6 cm) • Suitable Portable De Humidifier to maintain 30- 60% RH • Temperature and Relative Humidity Digital Indicator with calibration certificate from ISO 17025 accredited lab. • Reference NIST Standard Polystyrene film (0.3 mm) over the range of 3800 cm^{-1} to 650 cm^{-1}.
Attenuated Total Reflectance	Single / multiple (horizontal) reflection Attenuated Total Reflectance (ATR) with ZnSe prism – as a demountable integrated unit (minimum range of 7800 – 550 cm^{-1}) Variable temperature Cell Holder with temperature controller with one NaCl external window and one KBr external window – for studying both solids and liquid samples

Temperature range	Heatable with temperature range: minimum 90 to +150 °C Heatable cells with KBr windows for liquid samples – 2 nos Heatable Spacers (2 sets as mentioned above) for variable path length Heatable cells with KBr windows for solid samples – 2 nos
Vacuum pump	Suitable high-quality vacuum pump (preferably oil free) for variable temperature cell
Data processor and software	• Licensed software should have real time data collection and should have the facility to continuously monitor the performance of source, detector, power supply and laser. • Software applications: Auto calibration, Compare Software, Spectral Search; Quantitative Analysis, Automatic atmospheric suppression; Spectral interpretation for unknowns; Quality checks programs • Built-in libraries for edible oils and any other foods Compatible Computer + Monitor + accessories – with latest RAM, suitable software and with Licensed Windows installed with Laser printer
Power requirements	230 V / 50 Hz – 230V/60Hz
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration certificate	Polystyrene film over the range of 3800 cm^{-1} to 650 cm^{-1} from ISO17025 laboratory
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications

List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable rating UPS (60 min back-up)
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

23. ABBE'S DIGITAL REFRACTOMETER	
Application: The Abbe refractometer owes its popularity to its convenience, its wide refractive index range (nD =1.3 to 1.7), and to the minimal amount of sample needed. It is widely used to determine the sugar content in liquids and fruit juices, check the alcohol content of wine and beer, and to monitor and control the quality of yoghurt, jam, fruit extract, syrup, coffee extract, chocolate, milk, baby food etc. by measuring the total solids.	
Specifications	**Requirements**
General	It should be a small foot print battery powered with a single Eyepiece with digital display Measurement of liquid and viscous samples, regardless of their turbidity, viscosity, transparency and absorption.
Measurement prism	Optical glass
Light source	LED (Approximating to wavelength of D-Line)
Wavelength	589 nm
Scale	Refractive Index Brix
Measurement Range	Refractive index (nD): 1.3000 to 1.7000 Brix: 0.00 to 95.00% (5 to 75 ^{o}C ATC)
Resolution	Refractive index (nD):0.0001 Brix: 0.01 % Temperature: 0.01^{o}C
Measurement Accuracy	Refractive Index (nD): □0.0004 Brix: □0.03% *When measuring a standard sucrose solution of up to 50% Brix or standard refractive index solution in MODE 1 at 20 ° C
Repeatability	Refractive Index (nD): □0.0002 Brix: □0.01% *When measuring a standard sucrose solution of up to 50% Brix or standard refractive index solution in MODE 1 at 20 °C
Temperature control range	5.0 to 75.0 °C (No lower than 10 °C below the ambient temperature and no higher than 55 °C above the ambient temperature)
Calibration standards	Calibration block: 1 No and contact solution(1-Bromonaphthalene) and any other standard solutions
Modes	MODE -1: Displays the measurement value once the sample reaches the target temperature MODE: 2: Measures Refractive index and temperature at fixed intervals and displays the estimated measurement value at the target temperature MODE-3: The thermo-module can be turned off. Without temperature control, the measurement value is displayed in 4 seconds after the START key is pressed MODE – S:12: Displays the measurement value once a certain level of sample stability is achieved
Power requirements	230 V / 50 Hz – 230V/60Hz
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced

	maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Performance certificate	From at least two Institutions, where same model has been installed in the previous 2 years
Warranty	2-year after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable rating UPS/stabilizer (30 min back-up)
Quality Requirement	• Calibration certificate from ISO17025 accredited laboratory. Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be

	required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

24. AUTOMATIC DIGITAL POLARIMETER	
Application: It is used for measuring the concentration of sucrose in juices and jaggery and the purity of these products. All sugars are optically active, and therefore, their concentration can be conveniently measured by means of the polarimeter.	
Specifications	**Requirements**
Measuring Mode	Optical Rotation, Specific Rotation, Specific Rotation Plus Concentration, Sugar Scale °Z(ISS)
Display	On screen LCD / LED (touchscreen) and / or on personal computer via USB ports (if operating on PC, PC requirement should be mentioned). Touch-screen will be preferred
Accuracy	0.001 deg Arc or better
Reproducibility	0.001 deg Arc optical rotation
Resolution	0.001 deg Arc optical rotation, 0.001% concentration, 0.001 specific rotation
Measuring Range	± 89.9 deg Arc Optical Rotation, ± 999.99° Arc Specific Rotation, 0-99.9% Concentration
Optical Wavelength	589 nm Na and Tungsten-halogen or Hg- Lamp (for 633 mm / 578 mm / 546 mm / 436 mm / 405 mm
Light Source	Sodium/Tungsten-halogen/LED with life time 100,000 h of operation
Prism	Glan Thompson Calcite prism with life time Guarantee
Detector	PMT
Aperture	Should be variable for low concentration measurements
Temperature Control	With In-built Peltier module; Temperature Range 15 °C to 40°C; Temperature Accuracy: ±0. 1 □C
Calibration Automatic	Calibration In-built via touchscreen.
Calibration Standards	NIST traceable Standards for sugar solutions
Response speed	Approx. □6□ / sec
Measurement time	5 Measurements in less than 25 sec Avg.
Sample Compartment	Accept sample tubes up to 200 mm
Compliance	Full GMP/GLP and 21 CFR Part 11; Audit trail
Data memory	>2 GB
Interfaces:	Min. 4 USB ports, RS 232 standard or later standard, Ethernet, VGA port, CAN bus. Instrument should be compatible with common brands of PC, Keyboard, Printer and memory stick/external hard drives.
Sample cells	Two Sample cells having pyrex glass with stopper. Sample Length Sample Volume 1. 100 mm 1.5 ml 2. 200 mm 2.0 mL
Power requirements	230 V / 50 Hz – 230V/60Hz
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.

Recommendations or Warnings	Any warning signs would be adequately displayed
Performance certificate	From at least two Institutions, where same model has been installed in the previous 2 years
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, Engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable rating UPS/stabilizer (30 min back-up)
Quality Requirement	Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not

	exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

25. VISCOMETER	
Application: Rotary Viscometer is required to measure the dynamic viscosity, kinematic viscosity and density of food samples such as beverages, sauces juices, syrup and milk etc.	
Specifications	**Required**
Display type	Built-in-Display
Measuring range for dynamic viscosity	0.2 to 30000 mPas
Measuring range for kinematic viscosity	0.2 to 30000 mm^2/s
Measuring range for density	0.65 to 2.5 gm/cm3
Display Resolution	Viscosity: 4 significant digits or better Density: 0.001 gm/cm3 or better Thermostat: 0.01^0C or better
Accuracy	Viscosity: 0.5% of measured value or better Density: 0.01 gm/cm3 or better Repeatability $\pm 0.01^0$C or better
Standards	NIST traceable Viscosity and Density 4 no's each at various temperatures
Control system	Interfaces: 4 x USB, 1 Ethernet 1 x CA Bus, 1 x RS-232, 1 x VGA
Data memory	Inbuilt data memory for 1000 measurements or more.
Spindle/ Speed combination	18 or more
Training	The supplier shall provide on – site comprehensive training for scientific personnel operating the system and support services with the system.
Warranty	• Minimum 2 years warranty should be provided starting from date of satisfactory and faultless functioning of the equipment at the respective laboratory premises. • Comprehensive Maintenance contract (CMC) Service for 3 years, after expiry of standard Warranty should be quoted. • Annual calibration of the equipment shall be a part of the CMC. It shall also be mandatory to perform calibration after every major repair/breakdown.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and	List of all spares and accessories (including minor) with part

Accessories	numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable rating UPS/stabilizer (30 min back-up)
Quality Requirement	Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also, unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance Demonstration

PART B: EQUIPMENT FOR MICROBIOLOGY LAB

1. LAMINAR AIR FLOW (HORIZONTAL)	
Application: A Laminar flow hood/cabinet is an enclosed workstation that is used to create a contamination-free work environment through filters to capture all the particles entering the cabinet. These cabinets are designed to protect the work from the environment and are most useful for the aseptic distribution of specific media and plate pouring. Only the sample is protected and not the user.	
Specifications	**Requirement**
Working principle	The Laminar Airflow UV Chamber when switched on, the blower unit should create a suction pressure through the primary filter (or Pre-filter), which removes dust particles of above 10- micron size in the first stage. Subsequently, the filtered air passed to the HEPA filters, where the particles or substances of 0.3- micron size and above are removed. Finally, the ultra-clean filtered air supplied to the working chamber as a uniform airflow to perform precision analysis activities
Cabinet (Material of construction)	The system should have • Laminar Air Flow Cabinet should have fully enclosed bench designed. • The Laminar flow bench should have Stainless Steel SS 304 table with MS coated tabular frame and body. • Laminated Unit should also have stand by control system with lock and key.
Unit	The unit should have Should have LCD display to show measured parameters like stage velocity, total using time, UV/FL lamp on/off, etc Unit should have Differential pressure indicator.
Cleanliness level	The system should have CLASS 100 (ISO 5 for particle sizes 0.5 µ < 3530 particles/M^3 of air at both at Rest & Operation Condition as per ISO 14644 –1
Working area	Minimum 4 ft (w)x 2 ft (h) x 2ft
Work table	It should have SS 304 grade Stainless Steel with finish 4 polish surface Front door 5 mm thick clear Acrylic Sheet - Vertical sliding
Floor standing Base stand for cabinet	Have leveling feet or locking casters or motorized height adjustment.
Direction of flow	Vertical airflow
Airflow Speed	Filter face Velocity should have 90 Feet/Minute ± 20 (0.45 m/s)
Blower Assembly	It should have one set blower system, which consists of dynamically & statically balanced aluminium centrifugal impeller driven by 1/4 HP, single phase,1200- 1400RPM motor, enclosed in an PU coated GI casing suitably suspended in a pair springs & connected to the filter chamber through flexible canvas duct
HEPA Filters	The filters should have Size: 30” x 18” x 3” Type: Separator less type, Mini-Pleats HEPA Media Media: Ultra clean glass fiber paper

	Retention: 0.3 Micron Efficiency: 99.997% or better Initial Pressure: 16 mm WG Grade: H13 rating
Pre-Filters	Size: 600 x 300 x 65 mm Media: Synthetic, non-woven polyester Casing: Epoxy painted GI frame Retention: 10 Micron & above Efficiency: 90% Initial Pressure: 6 mm WG Grade: F7 rating
Particle Retention	0.3 Micron
Noise level	< 60 dBA±5
Power Supply	Power supply should have 220-230 V, 50 Hz. And all components UL listed and CE marked
Illumination	Externally mounted illuminating lamp with separate switch to illuminate the work area.
Light	High intensity, low wattage >800 lux It should be 15 Watts, ,1½ Feet length– 1 No. each
UV lamp	Pre-mounted UV lamp (30 W) with separate switch with UV light hours run indicator.
Other accessories	Two gas outlets in the working area, one on each side wall Leveling Screws & Castor Wheels PAO (Poly Alpha Olefin) test port Easily changeable pre-filters Fitted with UV Germicidal lamp for sterilization. Pre-installed pressure gauge for Measurement of HEPA Filters Choking system. Ensure noiseless operation and anti-vibration construction provides efficient working environment. Audible or highly visual alarm for filter replacement warning
Electrical sockets or Pass Through Ports	Side mounted switches for minimum three (15/5 amp) electrical sockets for ancillary equipment operation or Convenient rear-wall pass through ports for safe routing of instrument cords, cables and leads for 15/5 amps multiple socket with switches on the wall,
Standards Compliance	Performance specifications and construction must meet or exceed OSHA, ANSI and relevant international standards to assure operator safety
Certification required for sign off	Test Certificate for Mini-Pleat HEPA Filters Calibration Certificate for Pressure Gauge Calibration Certificate for Air Velocity Anemometer,
Spares	Spare compatible UV lamp– 2 Nos A spare HEPA filter for chamber – 1 No Gas burner (Bunsen burner) – 2 Nos

Operation and maintenance training component	The supplier will have to carry out successful installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for scientific personnel operating the system and support services till customer satisfaction with the system.
Warranty	Warranty for 2 years after satisfactory installation excluding consumable parts and accessories.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hard copy and soft copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
IQ/OQ/PQ	Pre-requisites before PQ All instrument like magnehelic gauges should calibrated before PQ DQ, IQ & OQ should completed before PQ. The following tests shall be carried out for PQ of LAF: Filter integration and installation leak test: HEPA Filters Integrity Test with PAO (Poly Alfa olefin). PAO penetration shown by photometer should be less than 0.001% through the filter media and should be "zero" through mounting joints Air velocity Air particulate matter counts (Non-viable & Viable) Air flow pattern using White visible or yellow smoke generator, Carbon tetra chloride or dry ice for smoke generation
Certificates Performance and safety standards (specific to the device type); Local and/or international	Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
Recommendations or warnings	Any warning signs would be adequately displayed

Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

2. BIO SAFETY CABINET CLASS II TYPE B2 (TOTAL EXHAUST)	
Application: Biological safety cabinet (BSC) is containment (physical barrier) intended to protect laboratory workers, laboratory environment and work materials from exposure to biohazardous aerosols and splashes while working with pathogens and infectious agents, such as primary cultures and stock. In the Class II Type B2 cabinet all inflow and down flow air is exhausted after HEPA filtration to the external environment without recirculation within the cabinet. This cabinet protects the work as well as the worker.	
Specifications	**Requirement**
Cabinet (Material of construction)	• Cabinet should be made from Galvanized Iron 18 SWG sheet metal with polyurethane paint coated finish and bottom will be supported with MS with PU coated modular stand which can be adjustable for height with leveling legs/or motorized. • External surfaces to be coated with antimicrobial coating to protect against surface contamination and inhibit bacterial growth. • Interior work area to be from a single piece of stainless-steel with large radius corners to simplify cleaning. • The cabinet work area must have s no welded joints, which collect contaminants or rust.
Unit	• The unit must be a bench top / console model. • Front door Made of clear 5 mm thick Toughened glass, vertical sliding, with Feather touch Motorized operation, while opening the door UV Lamp will be cut "OFF" And while closing the door UV Lamp will be "ON" Automatically. • Side Panels: Both the sidewalls are made from double layered outer GI & inner stainless steel with return-air plenum in between. • Edges should be perforated to avoid entry of room air into the work zone and exit of contaminated air in to the room and such contaminated air is sucked through this full height perforation at the edges of the sidewalls. • A recessed central area with drain pan to contain spills and prevent liquids from entering the lower filtration unit • The BSC shall be ergonomically designed for maximum user comfort and adjustability. • Fail-safe system to ensures that in case of exhaust failure, the cabinet's main fan automatically shuts down to ensure safety to the user
Cleanliness level	The system should have CLASS 100 (ISO 5 for particle sizes 0.5 µ < 3530 particles/M^3 of air at both at Rest & Operation Condition as per ISO 14644(ISO 5 (Class 100) US-FS 209 E) Conforming to NSF/ANSI 49, USA & En12469 standards.
Working area	Minimum 4 x 2 x 2 Ft (w x d x h) Interior work area to be from a single piece of IS304 grade stainless-steel with large radius (joint free) corners to simplify cleaning. The cabinet work area must have s no welded joints, which collect

	contaminants or rust.
Work table	It should have Removable type tabletop, made of perforated IS 304 Stainless Steel with satin finished.
Direction of flow	Vertical
Air Balancing	100% Exhaust & 0 % Re-Circulation
Particle retention:	0.3-micron particles with typical efficiency of >99.997%0.3 micron particles with typical efficiency of >99.997%
Airflow Speed	Minimum airflow velocity of 90 ft/minute ± 20 through the work access opening. Velocity should have 90 Feet/Minute ± 20 Easy to-read LCD/other display for continuous monitoring of cabinet airflow
Supply Air Blower	It should consist of dynamically & statically balanced aluminum centrifugal impeller driven by a single phase, 1440-RPM motor, enclosed in a PU coated Suspended in a pair of springs & connected to the filter chamber through flexible canvas duct inside the cabinet.
Exhaust Blower	It should have suitable displacing capacity having a static of 60 mm WG and made of mild steel and directly driven by a single phase, 1440-RPM motor. The exhaust motor & blower unit to be connected to the cabinet through an exhaust duct made of rigid PVC pipe.
Exhaust Duct	Direct-ducting (a leak-tight duct, a leak proof damper in the duct above the cabinet) to an exhaust system vented to the outside of the building without recirculation. Exhaust duct made of 125 mm diameter rigid PVC pipe. Suitable protection from rain with canopy at the end of the duct.
HEPA Filters	The filters should have Type: Separator less type, Mini-Pleats HEPA Media Media: Ultra clean glass fiber paper Retention: 0.3 Micron Efficiency: 99.997% Initial Pressure: 12 mm WG Grade: H14 rating Real-time display panel for remaining Filter lif
Pre-Filters	Media: Synthetic, non-woven polyester Casing: Epoxy painted GI frame Retention: 10 -15 micron Efficiency: 90% Initial Pressure: 6 mm WG Grade: F7 rating
Noise level	< 65 decibels on “A” scale ± 5 as per NSF 49
Cabinet Control systems	Should have Pressure gauge, motor voltage regulator, audible and visual window alarm, main and outlet power circuit breakers, Power switches for exterior mounted fluorescent lights and / or ultraviolet lights, interior outlets, and blower motor etc.

Illumination and light intensity	Must deliver uniform lighting to the work surface for greater comfort, reduced glare and improved productivity High intensity, low wattage, >800 lux Choke less to withstand larger fluctuations in voltage, Must be placed in a position to avoid turbulence in working area.
UV germicidal lamp	Germicidal UV lamp - Controlled by automatic UV lamp timer (lamp hours) Emission of 254 nm Lamp should be positioned away from operator line of sight for safety and proper exposure to interior surfaces. UV lamp should be in working zone The UV lamp should automatically switch "off" when the front door is opened to avoid accidental exposure of UV rays to the users'. UV Lamp Test: Output should not be less than 40 microwatts per square centimeter at a wavelength of 254 nanometers (nm)
Alarms	An audio alarm must be installed to indicate loss of exhaust flow. Should have Audible alarm to warn the operator if the window is raised above the recommended height
Certification required for sign off	Down flow Velocity and Volume Test report Inflow Velocity Test report Airflow Smoke Patterns Test report Lighting Intensity Test: Test Certificate for Mini-Pleat HEPA Filters HEPA Filter Leak Test with poly alpha olefin (PAO) or di (2-ethylhexyl) sebecate /polyethylene glycol Calibration Certificate for Pressure Gauge Calibration Certificate for Air Velocity Anemometer, Warranty Certificate
BSC standard compliance	Meet American (NSF/ANSI) or European standard EN 12469 (type tested) or both
Power Supply	Power supply should have 220-240 V, 50 Hz. And all components UL listed and CE marked Electric supply requirement
Operation and maintenance training component	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system and support services till customer satisfaction
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety

Supplier/ Manufacturer	Must be ISO certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
Recommendations or warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2 years after satisfactory installation and working excluding consumable parts and accessories.
Comprehensive Maintenance	Comprehensive Maintenance of the equipment supplied, installed, commissioned for 60 months after 2 years Warranty/Defects Liability Period. This will include yearly calibration start-up / commissioning routine servicing, regular maintenance, preventive maintenance of equipment and components and break down repairs as and when occurring, ensuring that system does not remain out of service for a period more than 24 hours in case of major breakdowns and 6-8 hour in the case of minor breakdowns due to any unforeseen break down. The institution will provide Water / Electricity power, etc. for maintenance work. The successful tenderer shall keep the essential spares at site during the Contract Period to avoid the delay in attending faults / maintenance
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

3. VERTICAL AUTOCLAVE	
Application: A vertical steam sterilizer to provide safe, economical and effective sterilization for microbiology laboratories that do not want to compromise on quality, safety and reliability and need to sterilize liquids such as nutrient media and buffer solutions, Solid items such as pipettes, tubes and filters and Glassware and plastic articles.	
Specifications	**Requirement**
Chamber	• Vertical loading type chamber with service basket and complying to the strictest international directives and standards equipped with • Steam collection bottles to remove most of the steam during operation • Ware inlet and outlet valve • Drain valve for cleaning or changing with fresh water • Constructed with appropriate stainless steel with superior corrosion resistance to water and steam • High temperature and pressure resistant silicon gasket • Built-in analog pressure gauge • Manual pressure release valve • Wheels/casters for easy transport.
Chamber size/ Capacity	Approx. 80-120 lit
Gauges	Should have a water level gauge Analog gauges for measuring inner and outer steam pressure. Should have an inner temperature indicator.
Chamber size/ Capacity	Approx. 80-120 L
Display	Fully Automatic PID Control ± 0.1 °C LED display for temperature and remaining time
Operating Temperature and accuracy	Maximum 123°C Temperature Accuracy: ± 0.5 °C at 121 ° C Must have Temperature calibration function
Operating pressure and gauge	15 -20 psi ANALOG PRESSURE GAUGE (0 -400 psi pressure gauge) indicating actual pressure
Timer	Automatic START/STOP timer
Safety warnings and alarms	• A cycle cannot start if the door is open or not properly locked • The door cannot unlock until chamber pressure reaches room pressure • Over-Temperature Cut-Off with audio visual alarm • Low Temperature Warning: If the temp. stays below 121°C for more than 5 seconds • Low Heat Warning: If the temp. does not reach the sterilization temperature during the set periods • Over-Pressure Cut-Off with audio visual alarm • Over Current Cut-off with audio visual alarm. • Low Water Level heater cut-off and ALARMS

Accessories	Perforated corrosion free baskets made up of SS 304 (3-4 Nos.) that are stackable two high or even more levels, Silicone gasket
Calibration certificates	Certificate from ISO17025 accredited lab for temperature, pressure gauges & timer.
Operation and maintenance training component	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system and support services till customer satisfaction
Certificates Performance and safety standards (specific to the device type);Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Recommendations or warnings	Any warning signs would be adequately displayed
Warranty	Warranted for 2 years after satisfactory installation and working excluding consumable parts and accessories.
Comprehensive maintenance	Comprehensive Maintenance of the equipment supplied, installed, commissioned for 60 months after 2 year Warranty/Defects Liability Period. This will include start-up/commissioning routine servicing, regular maintenance, preventive maintenance of equipment and components and break down repairs as and when occurring, ensuring that system does not remain out of service for a period more than 24 hours in case of major breakdowns and 6-8 hour in the case of minor breakdowns due to any unforeseen break down. The institution will provide Water / Electricity power, etc. for maintenance work. The successful tendered shall keep the essential spares at site during the Contract Period to avoid the delay in attending faults / maintenance
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;

Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
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4. INCUBATORS 1) AMBIENT TO 70 °C, 2) 5 °C TO 50°C and 3) 37 °C	
Application: For incubation of organisms, such as on agar plates, and also for conditioning of heat sensitive media and to provide an optimal, homogeneous, temperature uniformity and stability to ensure that protocols are fully reproducible –	
Specifications	**Requirement**
Material of construction	• Double walled construction with complete inner chamber made of Corrosion resistant stainless steel (AISI 430) • Outer chamber should be of steel sheet finished with powder coated point Insulation to maintain desired temperature • Inner glass door • Inner chamber should be fabricated with ribs for adjusting shelves to convenient height and shelves to be supplied • Shelves should be made of polished stainless-steel sheet as per chamber
Capacity	150- 200 L
Temperature range	• Temperature should be thermostatically controlled • Temperature should be thermostatically controlled with range 1) Ambient to 70˚ ±2˚ C and 2) 5 °C to 50°C ±2˚ C 3) 37 C±2˚ C • Over-Temperature cut-off with audio/ visual alarm • Low Temperature Warning alarm
Unit	Air ventilators to be provided on both side The equipment should be provided with microprocessor controlled digital display Temperature homogeneity between top and bottom shelves should be maintained by forced circulation
Calibration	Certificate from a ISO 17025 accredited lab for 3 different temperature points
Operation and training component	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.

Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
Recommendations or warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2 years after satisfactory installation and working excluding consumable parts and accessories.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of: • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Compliance statement	The quote should also include a compliance statement vis- à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

5. DIGITAL COLONY COUNTER	
Application: For fast and accurate bacterial or mold colony counting and to aid in determining counts of colony clusters and exceedingly large or small colonies, and can accommodate multiple dish sizes or formats	
Specifications	**Requirement**
Material of construction	Full Stainless-steel fabricated body with duly heat cured epoxy coating.
Display and counting	It should consist of • Digital display up to 4 digits with confirmation by audible tone. • It should consist of Magnifying lens (greater than 2X magnification with digital marking pen) • Accepts petri dish up to size 140 mm diameter with a centering adaptor for standard 90 mm petri dish • Glare free viewing low energy bright LED's • A switchable black background viewing translucent and difficult to see colonies. • Zero reset button
Operation and training component	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
Certificates Performance and safety standards (specific to the device type);Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
Recommendations or warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2 years after satisfactory installation and working excluding consumable parts and accessories.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be

	• supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

6. LAB BLENDER (PADDLE TYPE)	
Application: A powerful compact and ergonomic lab blender adapted for optimal homogenization and bacterial extraction without cross contamination	
Specifications	**Requirement**
Unit	• Should have chamber of stainless steel with an opening door • Should have multi-function digital display Provision of adjustable blending power with on screen indicator. • Should have provision of removable paddles for cleaning and autoclaving • Should have facility for side by side paddle stop. • Provision of fully opening door facility for easy cleaning.
Disposable bag size	Appropriate to the model & capacity quoted
Capacity	50-400 ml
Temperature	Ambient operating temperature 10-35^{o}C.
Humidity range	Operating relative humidity range should be 10-89%
Adjustable timer settings	1sec-60 mins.
Paddle speed	Variable speed (4-10 strokes /sec or better
Sensor	To ensures immediate stop of blending in the event of a leakage
Accessories	Bags (1000 numbers), Bag clips (50 numbers) Bag storage rack/stand (2 numbers) Bag sealer
Operation and training component	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
Recommendations or warnings	Any warning signs would be adequately displayed
Warranty	Warranted for 3 years after satisfactory installation and working excluding consumable parts and accessories.

Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

7. SEROLOGICAL WATER BATH	
Application: The water bath is for routine use in microbiology protocols as well for proper suspension of microbes in the medium with precise temperature control	
Specification	**Requirement**
Material of construction	• Rounded, seamless stainless-steel bath to preventing rust, chemical damage and contamination. • Powder coating like epoxy coating exterior for easy cleanup • Corrosive resistant stainless-steel Gabled drip free lid
Unit	• Microprocessor controlled digital display. • Instrument should have lift up drip free bath cover; • Carrier racks should be given for flasks and test tubes racks. • Convenient water bath drains. • Water bath surface coating should prevent contamination and formation of algae. • Easy cleaning
Temperature	Temperature Range: +20°C to 99°C Temperature Accuracy: ± 0.2 °C at 37 .0°C Temperature Uniformity: ± 0.5 °C at 37 .0°C Digital LED display for operating status of TEMP Over-Temperature Cut-Off Temperature calibration function
Alarms	Audible warning safety signals should be there for high/low temperature warnings Low liquid level
Calibration	Certificate from a ISO 17025 accredited lab for 3 different temperature points
Operation and training component	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements(or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/ahoc) to be declared by the manufacturer;
Recommendations or Warnings	Any warnings would be adequately displayed

Warranty	Warranty for 2 years after satisfactory installation and working excluding consumable parts and accessories.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of: • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
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8. BINOCULAR/ COMPOUND MICROSCOPE	
Application: A System complete with illumination system is required for proper viewing and enumeration of individual cells, even living ones with high magnification microscope using 2 eye lenses to reduce the eyestrain	
Specifications	**Requirement**
Body	Body-Single mold sturdy stable base stand, inclined Binocular body 30 °, 360º rotatable head with focus adjustment controls. A durable textured acid resistant finish All optical parts including objectives, eye pieces and prisms should have anti-reflective coating which also gives anti- fungal property. All metallic parts should be corrosion-proof, acid proof and stain-proof.
Eye piece	-Highest quality 10 X/20mm wide angle anti fungus field eyepiece. One with pointer. Diopter adjustment must be present on both eye pieces. (the image of the object as seen through the binocular eyepiece should be well defined centrally in at least 2/3 field of view) Achromatic, wide field, 10 x with inbuilt pointer. The eyepiece should be aplanatic and have a minimum field number of 18 Diopter adjustment must be present on one/both eye pieces or on the eye piece tube.
Optical system	Optical system should be infinity corrected. Built-in LED light source with white light with intensity control and LED life of more than 10, 000 Hrs.
Objective	-Parfocal, antifungal coated 4□, 10□, 40□and 100□ (oil immersion) with semi planner achromatic correction. Objective should be well centered even if their position on turret is changed. 10□□ 40□ and 100× objectives should have numerical apertures of 0.25 and 0.65 respectively. 100□should have numerical aperture of 1.25 and should be of oil immersion. Unbreakable containers to be provided for storing the objectives. All objectives should be wide field, achromatic and par focal.
Nose piece	Backward tilted revolving nose piece suitable to accommodate four objectives with click stop . It should be provided with rubber ribbed grip for easy rotation mounted on a precision ball bearing mechanism for smooth and accurate alignment. Extra ports if any should be fitted with dust& fungal proof metallic/ebonite caps.
Focusing:	Coaxial coarse and fine focusing knob, capable of smooth, fine focusing movement sensitivity; minimum: 300 micron; focusing stop for slide safety.

Stage	Stage uniformly horizontal, mechanical stage having dimensions of length 140 mm (+/- 20mm) with fine Vernier graduations (minimum reading accuracy of 0.1 mm). It should be designed with convenient sub-stage vertical coaxial adjustment for slide manipulation. The stage should have ball-bearing arrangement to allow smooth travel in transverse directions i.e. 80 mm (+/-5mm) and front to back direction, 50mm (+/- 5mm).
Sub-stage condenser	Abbe-type condenser with numerical aperture (N.A.) 1.25 focusable with rack and pinion arrangement incorporating a spherical lens and an iris-diaphragm
Sub-stage illuminator	The system should have a build-in variable light source (Illuminator). This light source should have a 20 W, 6 V Halogen lamps. The system should be provided with a step down transformer and an on-off switch and intensity control. The lamp should be provided with a lamp socket which has the facility for easy replacement of the bulb
Power supply & protection	Voltage 220 V AC, 50Hz. should have one on-off power switch A plano-concave mirror in fork mounting should be supplied which would be attachable to the base for field use when power is not available. Should have over-charging cut-off with visual symbol
Battery backup	Minimum 1 Hour
Operating and storage conditions	Capable of operating continuously in ambient temperature of 10 to 50 ° C and relative humidity of 15 to 90% in ideal circumstances. Storage condition: Capable of being stored continuously in ambient temperature of 0 to 50 °C and relative humidity of 15 to 90%
Manual Accessories	Working manual should be provided with each microscope. Immersion oil 25 ml □ 2 lens tissue paper 2 rolls or boxes) Lens cleaning solution (100 ml) One anti-static cleaning brush. The unit shall be capable of being stored continuously in ambient temperature of 0 -50 deg C and relative humidity of 15-90%.
Digital camera	• Mega pixel scientific grade (even at dim light) colour CCD camera along with image capture and analysis software and c-mount adapter. Resolution at least 2448 x 1920 effective pixel (4 x 4 binning and 2 x 2 binning) and 10-bit digitization. • Microscope should come along with PC (i5 6200U processor, 6 GB RAM, 1 TB HDD, DVR R/W, LED 20”). With UPS (minimum offline backup of 30 minutes).

Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010- 2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets(hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Warranty	Warranty for 3 years after satisfactory installation and working excluding consumable parts and accessories.
Operation and maintenance training	The supplier will have to carry out successful installation at our laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for scientific personnel operating the system and support services till customer satisfaction with the system.
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

9. HOWARD MOLD COUNTER	
Application: It is use in determining mold counts (mold fibres and spores) in tomato products and for mold counting in food quality control applications for other fruit- based preparations and **mold** mycelia in butter and cream.	
Specification	**Requirement**
Counting chamber	Constructed entirely of glass. Centre of glass should contain a 15x20mm rectangle that is flanked by 0.1 mm shoulders on each side to support cover glass Rectangle and Cover glass should have optically plane surfaces Facilities for calibration of microscope
Eyepiece micrometer	Ruled into squares (grid), each of which is equal to1/6 of the diameter of the eyepiece diaphragm opening
Cover slips	Thin 28mm x 33mm x 0.5mm 2 Nos Thick 28mm x 33mm x 1.0mm 2 Nos
Certificates Performance and safety standards (specific to the device type); Local and/or international	Should be compliant with the requirements of FDA/CE/BIS
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required;
Demonstration and training	The supplier will have to carry out successful demonstration at our laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for scientific personnel operating the system till customer satisfaction with the system.
Certificates Performance and safety standards (specific to the device type); Local and/or international	Should be FDA/CE/BIS approved product. Manufacturer and Supplier should have ISO 13485 certification.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

10. BOD INCUBATOR	
Application: For use in microbiological laboratories to measure biochemical oxygen demand (BOD). The incubators are used to sustain and control the humidity and temperature essential to perform many types of experiments in, microbiology and biology cells.	
Specifications	**Requirement**
Double walled modular structure with 3" thick PUF insulation	i) Outer wall: Powder coated steel sheet with resin baked finish/texturized steel ii) Inner wall: Stainless steel SS304 with ribs for adjusting removable perforated shelves at the height of 45 mm. The nuts, screws and hinges of the inner chamber shall be of Stainless Steel 304) Perforated Stainless Steel 304 Partition tray (6 nos.)
Doors	Double door type Inner Door: Full view inner acrylic/tempered glass door with aluminum channel boundary, closes on a resilient gasket and permits view of the specimens (inside the Incubator), without disturbing the thermal conditions inside the chamber. Interior illumination Outer Door: Powder coated steel sheet with resin baked/texturized steel finish
Capacity	350-400 L
Temperature Range	5°C to 60°C with digital controller, Temperature increments 0.1° C
Control Accuracy	± 0.1 °C or better (at 60°C).
Distribution Accuracy/uniformity	± 1 °C or better (at 37°C).
Temperature display	Microprocessor based Digital display of temperature along with calibration certificate by ISO 17025 accredited agency. The unit should have 2 independent PT 100 sensor for measuring the temperature with auto switch over function in case one of the sensors fails. Temperature recorder for inner chamber with maintenance free battery backup and auto charging of battery
Air circulation	With two completely in-built motors along with fan to keep the temperature uniform throughout the chamber
Heat up time & Cool Down time	30 min. up to 60 ° C without load. 40 min. up to + 5 ° C without load
Timer	0 to 24 hrs X 7 days cyclic ON / OFF timer for illuminating port
Safety Alarms	• Provision for audio-visual alarm to indicate • Door opening after 2 min. • Self -diagnosis function including overheat /under heat Prevention and over current Protection
Computer Interface	RS 485 / RS232 interface for multiple & single communication port

Voltage stabilizer	Automatic Stabilizer, 4 KVA with TDR (3minutes) electronic type
Documents Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Complete with IQ, OQ, PQ, Documents, Operations and Maintenance manuals
Supplier/ Manufacturer	Must be ISO certified for quality
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of: • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Warranty	Warranty for 2 years after satisfactory installation and working excluding consumable parts and accessories.
Operation maintenance& training	The supplier will have to carry out successful installation at our laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for scientific personnel operating the system and support services till customer satisfaction with the system.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

11. MICRO FILTRATION UNIT	
Application: Used for the collection and preparation of samples, mobile phases, and buffers to obtain the highest quality results from downstream analysis	
Specification	**Requirement**
All-Glass Filter Holder	With borosilicate glass funnel and base, anodized aluminum spring clamp, silicone stopper, coarse-frit glass filter support and PTFE-faced funnel and base for 47 mm disc filters 90 mm disc filters 25 mm filters
Stainless Steel Vacuum Filter Holders	Analytical Filter Holders For 25- and 47-mm disc filter.
Filtering Flasks	Side arm connects to vacuum source with 3/8in. I.D. hose. 1 L and 4 L flasks accept no. 8 perforated stopper. 125 mL flask accepts no. 5 stopper.
Filter Forceps	Highly polished stainless-steel forceps blades with beveled, un-serrated tips to prevent damaging the membrane filter.
Oil less vacuum pump	Flow rates of up to 37 L/min
Membrane Filters	Filters 47mm, 90 mm and 25 mm for Aqueous solvents Hydrophobic solvents
Warranty	2 years after successful installation and demonstration
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

12. FUMIGATOR (FOGGER)	
Application: Fumigation and fogging are two methods commonly used in laboratories to control the microbial contamination. For fogging a fogger machine that dispenses the fogging solutions uniformly across the contaminated area is used.	
Specifications	**Requirement**
Capacity	5 L with easy cleaning facility
Material of construction	Body should be compact, durable, leak proof and made of stainless steel /heavy duty plastic
Particle size	It should produce aerosols with particle size of less than 5 microns The blower head should be rust proof inert to Formaldehyde, $KMnO_4$, H_2O_2 and deliver aerosols uniformly.
Unit	• It should be compatible with all disinfectant solutions usual concentration. • It should be compatible with maximum pH range (both acid and alkali). • The equipment should be of good quality and conform to national/ international standards.
Power supply	The machine should operate on 220 +- 10 volts, 50 Hz, single phase, A.C Provided with Cable should be at least 5 meters in length, ISI marked.
Operation	The discharge rate should not be less than 1 L/25 minutes. The tank capacity, discharge rate and timer on the machine should be so that the disinfectant should be able to disinfect 4000-5000 cubic feet in one cycle of 2 hours (max).
Operation and training component	The supplier will have to carry out successful demonstration at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
Warranty	Warranty for 3 years after satisfactory working excluding consumable parts and accessories.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation;
Payment	Payment only after satisfactory performance demonstration

13. ANAEROBIC JAR	
Application: The Anaerobic Jar System provides oxygen free environment applied in microbiological laboratories for the isolation/culturing of anaerobic and microaerophilic microorganisms	
Specifications	**Requirement**
Capacity	12 L total volume (1 no) 3-4 L (1 No)
Material of construction	Transparent, unbreakable polycarbonate jar.
Unit	• Jar should be provided with pressure -cum -vacuum gauge attached to the lid • Jar should be ideal for all strict anaerobic test conditions. • Lid should consist of O- ring gasket. • It should be provided with petri dish (100 mm diameter) carrier/SS rack. • Schrader valve and screws to connect to vacuum pump
Vacuum pump	Suitable oil free vacuum pump for the system
Accessories	Catalyst/gas pouch startup kit Anaerobe indicator tablets Lid, complete with clamp and screw O rings
Operation and training component	The supplier will have to carry out successful demonstration at the laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements(or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/ad-hoc) to be declared by the manufacturer;
Recommendations or warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 3 years after satisfactory working excluding consumable parts and accessories.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;

Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation;
Payment	Payment only after satisfactory performance demonstration

14. AUTOMATIC SAFETY BUNSEN BURNER	
Application: The Bunsen burner is a common laboratory tool used for heat sterilization. It provides a flame with temperatures up to 1200°C. It is commonly used for processes like sterilization, combustion, and heating. In microbiology laboratories, it is commonly used for micro-loop sterilization	
Specifications	**Requirements**
Application	For use in Laminar flow chambers and Biosafety cabinets for sterilization of loops etc.
Basic features	Safety Bunsen Burner with flame monitoring, overheating protection and display movement sensor for safe operation. Two adjustment knobs for air and gas to allow easy fine-tuning of flame size and temperature. For heating applications or to flame-sterilize necks of large Erlenmeyer flasks, the Safety Bunsen Burner should be equipped with a long burner head.
Operation modes	Manual by matches, Infrared sensor with the push button without the need of a lighter, Foot switch.
Material	UV- and solvent-resistant, Smooth, chrome-plated metal housing.
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Warranty	1 year after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least).
Service Support	Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer.
Training	The supplier will have to carry out successful installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	• All accessories for running with natural gas should be supplied including tubing • Main adapter • Adapter for standard gas hose with inner diameter 10 mm.

Performance certificates	• Should be FDA/CE/BIS approved product. • Manufacturer and Supplier should have ISO 13485 certification under ISO 9001for quality standards. • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

PART C: AUXILIARY EQUIPMENT

1. CENTRIFUGE (REFRIGERATED	
Application: A Multi-functional, general purpose High speed refrigerated bench top centrifuge used for separation of supernatants (liquid portion) from pellets (solid portion)	
Specification	**Requirement**
Base Unit	Table top centrifuge with maintenance free brushless motor and have low access height CFC free refrigerant LCD Digital Display of time, speed and Temperature and run conditions Compatible with all fixed angle and swinging bucket rotors Automatic rotor recognition facility Automatic imbalance detection and cut-off Should be programmable with easy preset programs for fast temperature for pre-cooling and short spin. Should have motorized lid lock system
Temperature Range	0 ºC to 30 ºC
Speed	Maximum speed: 20000 RPM (with no load
Rotors	**Fixed Angle Rotor** for 50 ml bottles 15 ml Falcon tube 1.5-2.0 mL Eppendorf tubes and adaptors for 0.2- and 0.5-mL tubes/ Eppendorf **Rotor for 2.0 mL** Eppendorf tubes (12 places or better) with RPM 20000 **Deep-well micro plates rotor** Two 96 well plates for swing out type with RPM 3500 **Swing out rotor: -**
Accessories	Bottles, falcon tubes, adapters etc One set of Other items (rotors/adapters) required for improving the applicability/system performance should to be quoted as optional
Power Requirement	220 v to 240 v -50 Hz If a voltage stabilizer is required, it should be supplied along with the unit
Voltage stabilizer	Suitable voltage stabilizer to be provided
Certificates Performance and Safety Standards	Should have necessary certification for safety and quality standards from national/ international bodies Optimum safety according to national and international regulations (IEC 1010
Supplier/ Manufacturer	Must be ISO and CE certified for quality
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.

Recommendations or Warnings	Any warning signs should be adequately displayed
Warranty	Warranted for 2 years, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Voltage stabilizer	Suitable voltage stabilizer as required for functioning of the equipment
Quality Requirement	• Should be FDA/CE/BIS approved product. • Manufacturer and Supplier should have ISO 13485 certification under ISO 9001for quality standards. • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.

Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

2. DEEP FREEZER (UPRIGHT)	
Application: Deep freezers are used to store samples, reagents & kits, reference materials at low temperature i.e., around -20 ° C to -30°C.	
Specification	**Requirements**
Type	Vertical
No of Door	Single
Position of Door	Front
Type of Insulation	PUF
Frost Free	Yes
Type of Cooling	Direct
Castor	Heavy Duty Lockable
Capacity	: 250 L or higher
Shelves/ Drawers	Sealed 5-7 pullout drawers / shelves of different sizes that can be adjusted for storage flexibility
Material Of Chamber Interior	Stainless steel, preferably 304 grades
Material of Chamber Exterior	Stainless steel, preferably 304 grades
Door Material	Stainless steel, preferably 304 grades
Finish	Powder coated exterior finish
Temperature Range	- 10 °C to - 30 °C
Temperature Uniformity in Degree Celsius	±3 °C or less
Temperature Stability of System in Degree Celsius	±3 °C
High Quality Door Seals	Yes
Lockable Outer and Inner Lids	Yes
Control	Fully programmable microprocessor controlled with membrane keypad and eye level control panel
Display	**Easy to read**, LED control panel and alarm status with integrated diagnostics
Acoustic Safety alarms	Should be equipped with for High/low temperature, door ajar and malfunction alarms, sudden power failure, system failure and battery low
Temperature History	Data logger for temperature and temperature history which can be downloaded via a USB port Yes
Should Have Battery Back Up for The Display and Security Lock for The Display	Yes
Refrigerants	CFC-Free, HCFC-Free non inflammable refrigerants
CO2 cylinder should be supplied with freezer for backup	Yes (Optional)

Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Warranty of complete unit)	3 Year from the date of satisfactory functioning
Warranty of stabilizer in years	3 Year
Warranty of compressor in years	10 years or more
Service Support	Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Voltage Stabilizer	Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified

Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

3. FUME HOOD (Heavy Duty High Suction)	
Application: It is safety equipment used in all chemical laboratories to limit human exposure to hazardous or toxic fumes, vapours or dusts. Fume Hoods with floor mounted systems are designed to meet the challenges when working with chemicals, chemical fumes and other flammable materials etc. with a high degree of efficiency.	
Specification	**Requirement**
Coupling	Direct
Balancing	Dynamically
Type of Filter	HEPA
Overall Dimensions / Working Size	The system should have following Overall Dimensions: Overall Length of Fume Hood: 1500 -1550 mm Overall Width of Fume Hood: 750 - 1500 mm Overall Height of Fume Hood: 1500 – 2500 mm Length of Base Cabinet: 1000 – 1500 mm Height of Base Cabinet: 700 - 800 mm
Body Features	• Double Wall Construction • Body thickness: 10 mm (Min.) • Completely made from GI sheet with Highly corrosion resistant epoxy powder coating • Inner Chamber - Chemical & Heat Resistance, Fire retardant, smooth finish, easily cleanable, made out of durable PRL sheets of thickness 5 mm (Min.)/ SS 304 of 18- 20 gauge thickness. • Should be provided with Fume Hood installation Kit and Accessories • Should be provided with Safety Device Trip
Working Table Top	Granite / M.S Powder Coated Sheet Covered with P.P Sheet/ SS 304 Thickness of granite 18 mm (Min.)
Utility connections	Should be provided with Utility Pipe lines for Nitrogen, Compressed Air, Water
Outer Covering (MoC)	CRC, 18G, Epoxy Powder Coated
Exhaust Duct	• Chemically Resistant, PVC/PP duct pipe • Provided with bends, dampers, transitions and clamps up to blower • All joints should be curved in order to avoid any backtracking of fumes and a smooth flow to exhaust fumes • Two exhaust ports connected to the fume hood exhaust system internally
Sink & Tap	Size: 100 – 200 mm Shall made of chemically resistant material No leakage shall observe from Outlet Nipple Shall be provided with Single way / Three-way swan neck tap

Baffle Arrangement:	Removable, Chemically Resistant PVC Back Baffle to capture and remove/ slide fumes instantly at faster speed Three-point suction system (for light, normal & heavy fumes) with baffle to ensure smooth and immediate removal exhaust of fumes.
Exhaust Blower & Motor	Motor: Centrifugal Type, Motor Blower: 1.0 HP motor (3 phase, 50Hz, AC Supply) with phase MCB. Direct Driven, totally enclosed fan-cooled (TEFC), Squirrel Cage Induction Motor Chemical & heat resistance heavy-duty epoxy coated Min. 4 Watt
Scaffold/ Grid	Should be provided to hold the chemicals and apparatus
Door / Sash/ Shutter	Thickness – 4 mm (min.) Material - Toughened Glass Door vertical Folding Type with adjustable height
Air Flow	Low Constant Volume Exhaust Type Approx. 100 cubic meter/ hour
Noise Level	Not more than 65 dB
Face Velocity	0.5 m/s or 100 feet per minute
Shelves in Base Storage Units/ Cabinets	Number – 2 Type – Movable (With or Without Wheels)
Illumination	Florescent Lights – 2 nos. (Min.), 40 Watt
Electrical Arrangements	Min. 2 Nos. 15/5 amps 3 pin electric socket Switch for blower; Switch for Lightings
Power Requirement	220/ 230 Volts
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2 years, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier. • Equipment should be FDA / CE certified or equivalent standard of repute. It should be ISO 9001:2000 or other
	equivalent All calibration certificates must be from ISO 17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

4. HOMOGENIZER	
Application: A homogenizer is used for the proper mixing and comminution of the food sample to obtain a homogenous mixture prior to analysis	
Specifications	**Requirement**
General	It should be macerating and homogenizing of a variety of high moisture, high-fat and fibrous samples such as meat, fish, fruit, vegetables, prepared foods frozen meals, etc. Should allow frozen food samples to be homogenized in a short period of time, providing more.
Motor	Powerful 1500 rpm single phase motor
Bowl	It Should have 3.5 L or better, stainless steel bowl.
Sample capacity	0.1 – 1.5 kg sample capacity for homogenization
Mode	Pulse mode for frozen food applications
Blades	Blades should be multi-purpose stainless steel micro teeth blades as per standard SS316. Extra stainless-steel bowls and smooth blade cutter should be provided (01 Set).
Safety	A magnetic safety switch should be available from being operated without the transparent cover in the locked position.
Power supply	230V/50Hz, single phase with inbuilt/external protection for high/low voltage.
Documentation	Supplier should be provided IQ/OQ/PQ documents as per along with operator manual.
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	Warranted for 1-year, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Service Support	Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Voltage Stabilizer	Supplied with a suitable voltage stabilizer

Quality Requirement	• Product certification: CE / US FDA / BIS certified. Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier. • Should be compliant with the requirements of FDA/CE/BIS • It should be ISO 9001:2000 or other equivalent • All calibration certificates must be from ISO 17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

5. HOT AIR OVEN (FORCED AIR CONVECTION OVEN)	
Application: Hot air ovens are used in the lab to determine the moisture content of food products and for drying glassware	
Specification	**Requirements**
Size	Inner Volume 200 – 250 L
External Body	Mild Steel with powder coated/ Stainless Steel 304 Grade
Internal Chamber	Stainless Steel 304 Grade
Insulation	Mineral Wool/ Ceramic Wool
Door	Inner: Stainless Steel 304 Grade Outer**:** Powder coated Mild Steel/ Stainless Steel 304 Grade Self-closing magnetic lock having door sealing material suitable to high temp
Adjustable Shelf	2– 3 Perforated Stainless-Steel shelves (Removable) 304 Grade
Shelf Rest Pitch	30 mm
Temperature Range	40 °C to 300 °C
Least Count	0.1°C
Temperature Accuracy	± 0.5^{0}C or better
Temperature Uniformity	±2 °C or better
Heating Element	Nichrome wire / Kanthal A1/SS tube/pipe heater
Time to attain Maximum Temperature	Approximately 90 minutes
Control Panel	Door mounted Digital LCD display for set temperature, attained temperature, set time, heating ON/OFF
Preset Timer	With buzzer Digital display of time Least count- 1 minute
Circulation Method	Blower
Power Source	220-240 V, Single phase
Exhaust Port	30 mm ID on opposite side walls
Safety Device	Self-diagnosis function including overshoot/undershoot of temperature and over current protection Audio Visual alarm for door opening after 2 minutes
Optional Requirements	Dot Matrix Printer interface Temperature chart recorder PLC Controller Audio / visual alarm Extra shelves Heating Thermostat Manufacturer calibration certificate for three different temperature points from ISO 17025/NABL accredited laboratory

Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	Warranty for 2 years, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable on - line UPS (10 KVA) to support the instrument.
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier. • Equipment should be FDA / CE certified or equivalent standard of repute. It should be ISO 9001:2000 or other equivalent • All calibration certificates must be from ISO 17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

6. HOT PLATE	
Application: Hot plates are generally used to heat liquids as a part of sample preparation for analysis	
Specification	**Requirement**
Heating Plate	Top Plate Material - Cast Iron Top Plate Finish – Ceramic Coated resistant to acids, bases Body Material – Mild Steel Finish – Powder Coated Should include a separate Temperature Control Unit with PTFE or any acid resistant cord connection Ideal for heating samples and concentrated acids
Size (Dimension) & Shape	10 x 12 inches (minimum), Rectangular or Circular
Max. Heating Plate Temperature	Maximum temperature 250°C and accept up to 2L flasks /1L beakers
Controller	Energy Regulator
Power Supply	220 / 230 Volts, 50 Hz
Optional	• Overhead stirrer • PID Controller • Stainless steel heating plate • Support stand • Digital setting and display for temperature and time • Hotplate warning display while cooling till below 50 ^{o}C
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any..
Recommendations or Warnings	Any warning signs would be adequately displayed.
Warranty	Warranted for 2-year, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier. • Equipment should be FDA / CE certified or equivalent standard of repute. It should be ISO 9001:2000 or other equivalent • All calibration certificates must be from ISO 17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

7. HOT PLATE CUM MAGNETIC STIRRER	
Application: Hot plates are generally used to heat liquids. Hot plate with magnetic stirrer also contain a magnetic stirrer, allowing the heated liquid to be stirred automatically	
Specification	**Requirement**
Set-up plate material c	Ceramic
Set-up plate dimensions	180 x 180 mm or better
Number of stirring positions	1
Stirring quantity max. per stirring position (H2O)	20 L
Motor rating output	9 W
Direction of rotation	Right / left with automatic reverse rotation yes
Speed and Temperature display set-value /actual	LCD rpm/°C
Speed and temperature control	Turning knob
Speed range	50 - 1500 rpm
Speed deviation (no load, nominal voltage at 1500rpm and 25°C)	± 2 %
Stirring bar length	30 - 80 mm
Self-heating of the set-up plate by max. stirring	1 °C at RT:22°C/duration:1h)
Heat output	1000 W
Temperature setting range	0 - 100 °C
Temperature setting resolution	2°C
Heat control accuracy of heating plate (at 100°C)	±5 °C
Connection for ext. temperature sensor PT1000,	Yes
Timer	Yes
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately display
Warranty	Warranty for 1 year, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.

Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Quality Certification: ISO certified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier. • Equipment should be FDA / CE certified or equivalent standard of repute. It should be ISO 9001:2000 or other equivalent • All calibration certificates must be from ISO 17025: 2017 certified laboratory
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

8. SOLVENT FILTRATION UNIT	
Application: Used for the preparation of samples, mobile phases, and buffers to obtain the highest quality results for downstream analysis	
Specification	**Requirement**
All-Glass Filter Holder	With borosilicate glass funnel and base, anodized aluminum spring clamp, silicone stopper, coarse-frit glass filter support and PTFE-faced funnel and base for 47 mm disc filters 90 mm disc filters 25 mm filters
Stainless Steel Vacuum Filter Holders	Analytical Filter Holders For 25- and 47-mm disc filter.
Filtering Flasks	Side arm connects to vacuum source with 3/8in. I.D. hose. 1 L and 4 L flasks accept no. 8 perforated stopper. 125 mL flask accepts no. 5 stopper.
Filter Forceps	Highly polished stainless-steel forceps blades with beveled, un-serrated tips to prevent damaging the membrane filter.
Oil less vacuum pump	Flow rates of up to 37 L/min
Membrane Filters	Filters 47mm, 90 mm and 25 mm for Aqueous solvents Hydrophobic solvents
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
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9. MICROWAVE DIGESTION SYSTEM	
Application: Microwave digestion is a common technique used for elemental analysis. It is used to digest the food samples for their quantification using instruments like ICP-MS.	
Requirement	**Specification**
General	The system should have pressure protection or venting operation to avoid sudden acid spillage & venting that can damage the internal component of digester and electrical boards as well.
System	• Microwave digestion system should have temperature and pressure control mechanism. • The system should be software controlled. Different types of rotors available for the digestion of the different type samples should also be quoted. • Necessary consumables and maintenance parts should also be quoted to run instrument trouble free
Instrument Design	• The system should be a standalone work station and should have the feature of simply choose a method and it automatically recognizes the vessel type, counts the vessels and determines all of the parameters necessary for a fast, complete digestion • Should have provision that user can set the desired parameters for digestion • Should have Automatic Microwave power application depending on the load • Auto sensing of temperature and pressure inside the vessel • Be capable of processing different amounts of samples (from 0.3 g up to 2 g per vessel/) in the same run assuring the same conditions of temperature and pressure
Display	The Instrument should have the high-resolution, colour touch screen, acid resistant, LED/LCD screen should serve as controller and display Should provide training videos for sample preparation vessel assembly, system use, and maintenance Should have Data management – Easy access to stored methods, real- time data and results of past runs Should be able to display the detailed methods, graphs of temperature and power against time and temperature of individual vessels.
Interlocks	The system should have good interlocking system for safety and cavity door.
Rotor & Vessel Assembly	• High pressure and high temperature rotor with at least 12-20 PTFE vessels, work station & torque wrench. • Vessels on the rotor should be segmented for easy use. Maximum Temperature capacity of vessel up to 300 °C Pressure capacity of vessel up to 100 bar (1500 psi) or more • Vessel volume: offered vessels should be able to handle volumes as minimum as 3 ml, 10 ml, 15 ml & 25ml • Vessel Material- PTFE-TFM • Every vessel must have a vent-and-reseal spring to safely release the pressure in case of overpressure. • Burst-disk membrane or self-releasing / continuous venting

	device are not suitable due to very low performance. • Additional twelve numbers of vessels (of both sizes) as specified above should be supplied along with the system
Magnetron	Single/ Dual Magnetron system with rotating microwave diffuser for homogenous microwave power distribution in the cavity. Microwave frequency should be 2450MHz and installed power should be between 1400-1900W and should provide the temperature needed (300 °C) for difficult samples.
Microwave Cavity	• The cavity should be made of non-magnetic Rugged high-grade 316 solid steel cavity/ stainless-steel housing with PTFE plasma coating applied at 350 °C for corrosion resistance. • Also, all hardware should have 5-layer protective coating for the resistance from acid, alkali and corrosive gases. • The Cavity should be constructed with suitable window • The vessel assembly during a run should be visible from outside
Hardware & Safety	• Instrument should have adequate safety coatings on housing to prevent any corrosion in the cavity. Additional multiple ports on the side walls of the microwave cavity • Protected against acids and solvents with polymer coating on both inner and outer surfaces • Self-resealing pressure responsive and explosion resistant door to ensure maximum safety even in case of overpressure release • Door completely made of 18/8 stainless steel with suitable window. • Independent door safety interlocks to prevent microwave emission • Built-in exhaust system located above the microwave cavity and separated from the electronics to prevent corrosion • Magnetron protection from reflected microwave power • i. Continuous and PID-controlled microwave emission at all power levels
Sensors	• Temp sensor should be integrated in the system for monitoring & controlling each vessel and cavity temp. Temperature of each vessel should be displayed • The software should automatically reduce the microwave power in case of over temperature avoiding sample loss • Automatic Pressure control: should have a pressure sensor which has a total capability of up to 500psi automatically control the pressure. It should be possible to remove the pressure device at a high pressure. The Vessels should act as self-regulators of pressure

Control: User interface	• Software must allow the user to edit, save and run multistep unlimited number of methods (minimum 2000) with atleast 20GB on board / built in memory for storage of data • The software must control all parameter online and display temperature, time and power directly on the terminal/computer. The control terminal should have high resolution LED/LCD Acid Resistant display (minimum 18 cm (7 inch)). • Should have provision for manual programming storage apart from pre-installed program • Continuous display of temperature and power inside the reaction vessels is required
Output	One (1) parallel for external printer (HP Deskjet series) Minimum two RS-232 serial ports for connecting PC balance and service check
Computing	PC with most recent processor), 22" Full HD LED Monitor, Laser Printer dual side printing
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant EN 61326, EN 61000 • GLP-validated software for controlling the system
Supplier/ Manufacturer	Must be ISO certified for quality
Operating manuals, service manuals, other manuals	Should provide • Hard copy of User, technical and maintenance manuals in English language and. should be available on the system also • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs should be adequately displayed
Warranty	Warranty for 2 years, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.
Service Support	Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
UPS/Stabilizer	Suitable stabilizer or on - line UPS (4-5 KVA) to support the instrument.
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument

After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified. • Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system
Payment	Payment only after installation, validation and performance demonstration

10. MUFFLE FURNACE	
Application: A muffle furnace generates the high-temperature up to 1600 °C and turns the sample into ash. The chemical composition can be determined easily after determining the ash content. It is the best way to determine the quality and levels of silica of the food products.	
Specification	**Requirements**
Inside Chamber Volume	7 L or better With lift door with hot surface facing away from the operator and swing aside door at the front
Furnace construction	Double shell steel case with cooling fan to keep outside case cool High purity alumina fiber insulation for max. energy saving
Temperature Range	900 - 1600 ^{o}C
Standard Working Temperature	1200^{o}C
Temperature accuracy	+/- 1.0 ^{o}C
Heating element	The chamber section should be heated by six to eight Super Kanthal Molybdenum disilicide heating elements (Super 1800 grade MoSi2) suspended in a chamber made of high temperature refractory fiber lined with a combination of ceramic fibre blankets
Heating rate	The furnace should be of fast heating type with the maximum attainable temperature should reach as a ramp function in less than one hour.
Thermocouple	Pt. Pt. Rh. Thyristor controller will be provided along with the furnace to measure the temperature with Recrystalized alumina sheath & connecting holder complete set.
Temperature Control	PID automatic and programmable power control with necessary safety features Over-temperature limiter with adjustable cut-out temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
Cooling Fan/ Air Circulation	Attached with Furnace, provided inside the control unit to protect Costly component
Maximum power	Up to 8 KW
Accessories to be supplied	Al_2O3 Sample Plate 1 pcs Al_2O_3 Furnace Door Block 1 pcs Protection Glove 2 pairs Crucible Clip 1 pair Crucibles 6 pcs
Calibration Certificate	From ISO 17025/NABL accredited laboratory
Installation, training and commissioning	Vendor must ensure satisfactory installation and commissioning of the system.
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.

Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	Provide list of all essential spares and accessories
UPS	UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

11. FROST FREE REFRIGERATOR	
Application: It is commonly used equipment at microbiology lab for the purpose of storage of items which required low temperature i.e., between 4 °C to 8 °C e.g. food samples, media, chemicals, reagents, cultures.	
Specifications	**Requirements**
Design	• Vertical with wheels • Frost free, CFC free, Automatic Defrost • – 5 Height adjustable shelves • Internal LED Lighting • **Single Triple-Pane Glass Door with ergonomic** handle Key Lock • Automatic door closing • Fan forced air circulation to ensure stable & uniform preservation environment.
Controller	• Microprocessor Temp. Control Controller with 0.1ºC resolution • Controller to Display data about the unit and used to control temperature • Control panel should be at eye level with Digital Temperature display & Alarms
Construction	Electro-galvanized steel with white, oven baked epoxy-polyester, anti-microbial, powder-coated finish with 304 Stainless Steel inner chamber
Capacity	300 - 350 L
Temperature	Range: +1° C to +10° C Uniformity: ±3°C
Alarm	Open door, High/Low temperature, Clogged condenser filter
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least).
Service Support	• Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer. • Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number.
Training	Training of personnel After supply, training on instrument operation and troubleshooting etc., to be given to all laboratory personnel.
List of Spares and Accessories	Accessories as required for functioning of the equipment
UPS	UPS/Stabilizer as required for functioning of the equipment

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
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12. VACUUM OVEN	
Application: Vacuum Drying Oven is suitable for drying out liquids or solvents contained in food samples. The moisture lost from the sample out of the vacuum oven, which prevents the accumulation of moisture within the oven. The boiling point of water is reduced when it is placed under vacuum. Drying foods in a vacuum oven therefore has a number of advantages over conventional oven drying techniques. Drying is quicker and can also be carried out at lower temperatures so problems associated with degradation of heat labile substances can be reduced.	
Specification	**Requirement**
Useful volume	27 L or more
Shell construction	High quality fabrication of S.S body with double wall arrangement and M.S panel board with neat powder coat painting
Door	Specially designed SS door and inner door
Insulation	Alumina fiber insulation/Rockwool
Skin temperature	Maintained just above ambient
Number of trays	Two SS Trays (Min.)
Heating elements	Heater provided around the chamber
Operation	Single phase / AC Maximum Temperature: 200ºC Temperature control: PID programmable temperature indicator Accuracy: ±1ºC Indications: Main indicator and Output indicator Control Switches: Mains on, output on and output power selection Vacuum: Min 1 (One) Torr Vacuum Indication: Analog/ Digital gauge Vacuum pump: Rotary vane oil less Timer: Special timer for vacuum system
Operation function:	Fixed temperature operation, Auto-start operation,
Safety features	Self-diagnosis functions (Sensor, Heater Triac, Automatic overheating prevention), independent overheating prevention, Key lock function, Electric leakage breaker
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)

Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
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13. VORTEX MIXER (CYCLOMIXER)	
Application: Vortex Mixer is general-purpose laboratory equipment. It is used for mixing liquids in test tubes. It operates at various speeds and can be operated continuously or by "touch" activation.	
Specification	**Requirement**
Speed and control	User settable 200 - 3000 rpm or better
Operating Modes	ON (continuous), OFF, and TOUCH mix
Head	Standard rubber cup
Base	Heavy metal with Four suction cups
Movement	Orbital type movement
Accessories	Flat head Horizontal head, 12 x 1.5 mL Horizontal head, for 4 x 15 mL
Low Speed Operation Should Be Possible in Touch Activated Operation	Yes
Operation Type	Low Noise
Power Supply	200-240Vac 50Hz
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least)
Training	The supplier will have to carry out successful installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2- 40 for safety • Should have necessary certification for safety and quality standards from national/ international bodies
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be

	provided & supplier to assist till satisfactory PQ of instrument
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
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14. CIRCULATING cum SHAKING WATER BATH	
Application: Circulating baths are constant temperature water baths that enable rapid heating and cooling of samples by constantly circulating water. Water baths are primarily used to incubate samples containing test tubes, flasks and beakers etc. An integral pump circulates the bath water within the tank to maintain uniform temperature. The sample containers can be mechanically agitated	
Specifications	**Requirements**
Temperature Range	Working temperature range from +20°C to +99.9 °C
Display	Bright LED-Display with cutting-edge microprocessor technology with PID temperature control
Volume	Bath volume ~10-15 L (one) Bath volume ~20-25 L(one
Power	Power switch integrated in keypad
Temperature Stability / Uniformity @ 37°C	±0.02 °C
Adjustable shaking frequencies	Adjustable shaking frequencies from 20 to 150 RPM or better
Maintenance	Convenient bath drains to easily clean and maintain bath
Top cover	Lift-up bath cover
Alarms	Audible alarms for Dry-running protection and over temperature
Safety features	Self-diagnosis function (Heater defective, Sensor defective, Set value abnormal, SSR short circuit and Overheat protector) Warning buzzer and alarm lump, Over current, short circuit breaker, Heater no-load operation prevention device
Timers	Optimize scheduling with auto-on and auto-off timers
Accessories	Stainless Steel / Polypropylene Test tube rack, for 15-21 tubes of 23-25 mm, 25 -60 tubes of 12-16 diameter(each) 1nos Spring tray/ racks for Erlenmeyer flasks (250/500 mL)
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction
List of Spares and Accessories	Provide a list of all spares and accessories with part numbers
UPS	UPS/Stabilizer as required for functioning of the equipment

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	Instrument must be provided with all IQ/OQ/PQ documents
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
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15. ORBITAL SHAKER	
Application: Shaking incubators are combination of traditional incubators and a laboratory shaker used to simultaneously incubate and shake or agitate samples. They are ideal for laboratory working on cell culture, cell aeration and solubility experiments.	
Specifications	**Requirements**
Shaker requirements	• Single knob selects all operating conditions and quickly Triple-eccentric counter balanced drive • Acceleration circuit to prevent sudden start and stop should be available • Programmable controller offering up to 4 modes of timer and parameter control for reduced user intervention. • Timer 0.1 to 99.9 hours or continuous mode • UV germicidal lights. • Noiseless operation
Shaking Speed range	25 to 400 rpm with ± 2 rpm accuracy
Temperature range	20°C below ambient to 80°C with accuracy of ± 0.1°C and stability of ± 0.2°C at 37°C
Shaking orbit	approx. 25 mm
Display	Large, easy to read LCD display screen
Audible and Visible Alarm	Should indicate when speed deviates more than 5 rpm or temperature deviates more than 1°C from set point, and when timer operation has expired.
Overall dimensions	Minimum 62 x 75.4 x 82 cm (W x D x H)
Accessories	1.Universal Platform of at least 40 x 40 cm having capacity to holds assortment of various size of flask sizes up to 2 Ltrs and test tube racks. 2.System should be supplied with 125ml clamps (10 Nos.), 250 ml clamps (5 Nos.), 500 ml clamps (05 Nos.), 1000 ml (02 Nos.) and 2000 ml (01- 02Nos) 3. Test tube rack for 20x50ml tube-1 no and test tube rack for 42x15ml tubes-1
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least).
Training	Training of personnel After supply, training on instrument operation and troubleshooting etc., to be given to all laboratory personnel.
UPS	UPS/Stabilizer as required for functioning of the equipment

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	IQ/OQ/PQ of instrument and Software should be provided along with document
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

16. WATER PURIFICATION SYSTEM	
Application: Ultrapure water purification system is required for purification of water and making it free of contaminants that interfere with microbiological analysis. An ultrapure water system is equipped with ultra-filters to remove endotoxins, DNase and RNase left over from bacteria destroyed by UV, resulting in extremely low total organic carbon (TOC) and having a resistance of up to 18.2 MΩ/cm.	
Specifications	**Requirements**
General	Compact, Wall mountable/benchtop system for microbiology / molecular biology/LC-MS/MS grade water applications. Should deliver ultra-pure product water by point of use dispenser with flexible dispenser, volumetric dispensing and auto shut off facility.
Quality of water	Should deliver Type I/Ultra– pure as per International specifications as follows: Electrical Resistivity Min. 18.2 MΩ/cm @ 25°C Conductivity 0.055 µS/cm compensated to 25°C TOC level (system with UV lamp) <5ppb Flow rate > 1 lit / min Bacteria <1 CFU/100 ml Particulates(size>0.22µm) <1/mL Sodium (ppb)< 1 Chloride (ppb) < 1 Total Silica (ppb) < 3 Pyrogens <0.001 Eu/ml RNases free, <1pg/ml DNases free, <5 pg/ml
Storage	System should come with an inbuilt storage system of 5-8 L to store consistently high-quality pure water for prolonged period and prevent Contamination by ambient air.
Feed water	Should have separate feed water (Potable tap water) specific purification cartridge and application specific polishing cartridge
Control display	• Should have calibrated meters for continuous monitoring and display of water quality parameters: Product water resistivity / conductivity both compensated and non-compensated mode, product water temperature, • Alarms for product water resistivity greater or below set point • Should have display for maintenance: sanitization/exchange purification cartridges/activationof fast flush/ depressurization / air purge etc.
Consumable	Must Quote separately for consumables (cartridges, filters etc.) for ONE YEAR for trouble free working.
Validation	For validation vendor should having its own capability with their own company trained service engineer to perform validation. No third part validation will be entertained. One validation at the time of installation should be done by company personnel.

Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least).
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
Accessories	All cartridges, filters, pump or any such item which is /are essential for Installation and functioning /operating the equipment.
UPS	UPS/Stabilizer as required for functioning of the equipment
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Manufacturer and Supplier should have ISO 9001:2015 for Quality Management System & ISO 14000:2015 for Design of process plant, Design, manufacture & technical support of water purification equipment. • Electrical safety conforms to the standards for electrical safety EN 61326-1 EMC requirements Electrical equipment for measurement, control & lab use. • EN 61010-1 Safety requirement of electrical equipment for measurement, control & laboratory use.
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.

Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

17. GLASSWARE WASHER/DRYER	
Application: Glassware washer and dryer is automated equipment designed to wash and dry laboratory glassware such as beakers, flasks, and test tubes.	
Specifications	**Requirements**
Chamber volume of Washer/ Dryer	Option 1: 150 – 200 L capacity Option 2: 200 – 275 L capacity. Please quote for both the above options
Internal chamber type	Inner chamber, washing arms and tank filters made of high quality AISI 316 L stainless steel. Spray arms made of AISI 316L stainless steel (DIN 1.4404)
Front Glass Door	Glass Door version – Inside chamber must be visible, while in washing/drying run.
Control System	Soft touch LCD display. Microprocessor controlled.
Cleaning Liquid Dispenser	Minimum two automatic internal liquid dispenser Standard pre-programmed cycle At least 10 pre-programmed standard cycles.
Internal wash temperature control	Fully adjustable wash temp. up to 90 □ C
Circulation pump	For Option 1: 150 – 200 L capacity: Should have heavy washing pump feeding washing chamber spray arms and wash cart direct injection circuit: 550W power (290 L/min) For Option 2: 200 - 275 L capacity: Should have heavy washing pump feeding washing chamber spray arms and wash cart direct injection circuit: 750W power184.92 gal.US/min (700 L/min)
Steam condenser	Should have Standard steam condenser which prevents vapors from entering into the washing area
External tap water filtering system	Must include all external tap water filtering system, preferably from local supplier
Internal Baskets for placement of glassware inside	Must include basic 3 or 4 multipurpose baskets for storing test tubes, beakers, conical flasks, round bottom flasks, pipettes and petri dishes.
Built in Dryer Unit	Built in forced air dryer unit for drying entire glassware content after the wash/rinse cycle.
Consumables required for washing/ drying cycle	• Must provide all necessary washing chemicals for 100 wash run cycle. • All quality washing chemicals must be easily available in Indian market at reasonable price (Indian Rupees). • Imported washing chemicals/ consumables are discouraged.
Installation and Commissioning	The vendor must carry out the installation and commissioning at site, including the installation of tap water filter system. The tap water inlet and drain will be provided at site.
End User Training at site	Necessary end user training and instructions must be provided to all users at site.
List of present users in India	Must provide the list of users/ customers of this equipment in India.
Desirable Specification:	Telescopic bearing railing for loading the basket. Operator and Service manual with all spare parts list.

Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories. Provision should be there to extend the warranty up to 3 years (at least).
After sales service/Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction.
List of Spares and Accessories	List of all spares and accessories with part numbers
UPS	Suitable on - line UPS (5 KVA) to support the instrument.
Quality Requirement	• Should be FDA/CE/BIS approved product. • Manufacturer and Supplier should have ISO 13485 certification under ISO 9001for quality standards. • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.

Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

18. DIGITAL THERMOHYGROMETER	
Application: The thermo hygrometer measures both humidity and temperature of the laboratory environment. It is useful instrument for maintaining optimal temperature and humidity inside the lab	
Specifications	**Requirements**
Temperature	-20 °C to 60 °C ± 0.5 °C Readability 0.1 °C
Temperature accuracy	±0.5°C - ±1.0°C
Resolution	0.1°C
Temperature Update Rate	500 ms
Data storage capacity	99 points
R.H. Range	5 % to 95 % R.H. ± 2.5 % - % RH readability
Display	Backlit dual display of humidity and temperature
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration certificate	Calibration certificate from ISO17025 for Temperature and Relative humidity.
Warranty	2-year after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery backup	Suitable rechargeable battery

Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

19. NITROGEN EVAPORATOR (Bench Top)	
Application: The evaporator is used for evaporating solvents from extracts for concentration prior to chromatographic and other analysis	
Specifications	**Requirements**
General	A bench top work station Microprocessor based, High speed, small volume workstation to accommodate 50 tubes of different capacity (1.5 mL to 30 mL), through Gas vortex shearing action for evaporation. Each 10- position row can work independently Closed system with exhaust facility All racks to be supplied
Operation	Simultaneous automated concentration of multiple samples and unattended operation, automatic gas shut off and operational diagnostics
Display	LED/LCD
Pressure display	Bar/PSI/KPA unit selection
Keypad	Feather touch operation
Thermostatic water bath	Temperature range ambient to 90°C or better Temperature Accuracy: +/-2 □C
Gas Regulator and Gauge Range	0 to 30 psi.
Nitrogen gas generator	Technical specifications as specified under Nitrogen generator
Accessories	Evaporation tubes- 500 Nos Gas connection tubes – 20 m. Power cable – 1No Fuse -10 Nos
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration certificate	Calibration certificate from ISO17025 for Temperature and Relative humidity.
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.

After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery backup	Suitable rechargeable battery
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown

	intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

20. ROTARY EVAPORATOR		
Application: The system would primarily be used for efficient and gentle evaporation of solvents under control boiling point applying precise vacuum		
Specifications	**Requirements**	
General	Complete equipment from the same source of manufacturing for compatibility & integration Single point operation for all set parameters Single point ON/OFF for all attached accessories e.g. Chiller/Vacuum Pump	
Rotary evaporator	Protection class	IP 21
	Condenser Surface Area	1400 ~ 1500 cm^2
	Heating Bath control	RT to180□C or more with set and actual temp. display
	Maximum Safety	The glass parts should be Plastic Coated
	Speed	**(20 ~200 RPM) or more.**
	Lift:	Motorized/Electronics
	Default Supply:	With 1 L Receiving and Evaporating Flask
	Display:	RPM, Heating bath temperature, Height movement
	Operating Voltage	100-240V
	Operating Voltage	100-240V
Vacuum pump	Mode	Speed and Valve control
	Observation	Glass window for easy maintenance
	Default mode	Speed control
	Suction Capacity	1.8m^3 /h
	Maximum Number of Steps (Heads)	2
	Final Vacuum	10 mbar or better.
	Power consumption	180W
	Operating Voltage	100 ~ 240 V 50Hz
	Sound Level	32-57 dBA
Vacuum controller	Display Screen	4'3 LCD Display
	Display Parameters	Heating Bath Temp/RPM/Chiller Temp/Vacuum Options: To fix on rotary evaporator or Vacuum pump
	Protection class	IP 21

	Detection	Automatic detection of Heating Bath Temp
	Library	Common 53 solvent with auto detection of required vacuum
	Facility	Can be used independently if required
Re-circulating chiller	Cooling capacity	550W cooling power @15^{o}C
	Temperature range	-10°C to +25°C
	Voltage	230V, 50/60 Hz
	Temperature Display	Resolution 0.1 C
	Refrigerant	R-134a, CFC free refrigerant
	Temperature regulation accuracy	+/-2 □C
	Tank volume	3.0-5.0 L
	Flow Rate	2.5-5 L/min or more
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided Advanced maintenance tasks documentation, if any.	
Recommendations or Warnings	Any warning signs would be adequately displayed	
Calibration certificate	Calibration certificate from ISO17025 for Temperature and Vacuum.	
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.	
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified	
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications	

List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery backup	Suitable rechargeable battery/Suitable rating UPS
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

21. ULTRA SONIC BATH	
Application: Used for cleaning fitters, mixing, homogenization, dissolving and dispersion of particles in solvents	
Specifications	**Requirements**
Tank capacity	5 L or more (along with lid cover & drain valve)
Ultrasonic power	50 Hz or more
Ultrasonic frequency	0 to 40 KHz (variable with accuracy ± 2 kHz) (Ultrasonic power and frequency should be variable to form uniform cavitation in tank)
Heating temperature	1 to 100 °C with accuracy ± 1 °C (Temperature should be variable from 1 to 100 °C). Suitable chilling unit should be provided to achieve the desired temperature
Timer	Electronic digital timer (in 'min: sec ~ 00:00' format) with automatic switch on/off
Control panel	Digital indicator & auto-controller for temperature, ultrasonic frequency and electronic digital timer
Material of construction	All parts including accessories should be made of AISI-304/316 or equivalent stainless-steel material
Accessories	SS mesh baskets- 2 Nos Perforated trays - 2 Nos Beaker holder - 2 Nos Conical flask holder - 4 Nos Test tube holders - 2 Nos. Glass bottle holder - 2 Nos. Toolkit, cleaning accessories and spare parts
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration certificate	Calibration certificate from ISO17025 for Temperature
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified

Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite
	as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
Battery backup	Suitable rechargeable battery/Suitable rating UPS
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

22. NITROGEN GENERATOR	
Application: Nitrogen is used as a gas in several applications especially as an evaporating gas and Gas chromatography.	
Specifications	**Requirements**
General	The system should be, PLC Controlled Bench Top of modular design, compact in size, **LCD Touch Screen user interface** automatic operation, minimum noise level, low operational cost. Nitrogen should be generated from the atmospheric air. Whole system should be compact and properly assembled without any leakage with operating voltage 230v50 Hz **It should have a Hydrocarbon removal unit.** The equipment should be capable of running for 24 hrs. round the year
Installation	Indoor or benchtop Should work in temperature range of 15 to 30 □C in humidity range of 60-90%
Flow rate	1,250 ml/min
Purity	Better than 99.999%, :< 0.05 ppm Total Hydrocarbons
Delivery pressure	85 PSI or above
Method of Purification	Pressure Swing Adsorption Technology
External Air Compressor	• Suitable air compressor for inlet of feed air with necessary drier & filters & 5 m pipeline between air compressor & generator should be included. • Air quality of the external air compressor - ISO8573 - 1:2010 Class 1.4.1(clean dry air to enhance the life of the nitrogen generator. • Automatic on off modes depending on pressure side the compressor
Sound level	Nitrogen generator should have silent operations with max 25 dB and compressors sound level should be less than ≤80 dB. so that is can be kept inside the laboratory
Fittings	1/4'' Swagelok for outlet N2 and Inlet Air (if compressor is not installed
Power consumptions (watt):	≤ 500 W
Safety-	It should have safety system with safe alarms Automatic on off modes depending on pressure side the compressor
Power requirements	230 V / 50 Hz – 230V/60Hz
Accessories	Provide all the accessories
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or	Any warning signs would be adequately displayed

Warnings	
Calibration certificate	Calibration certificate from ISO17025 for sound level and evidence for N2 purity
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.
After sales service/ Post warranty	Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. Should carry out yearly PM with at least one PM kit Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable rating UPS
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any

	breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

23. LABORATORY GRINDING MILL	
Application: Mills grind by means of a high-speed rotating steel hammers or discs and are equipped with a sieve before the sample leaves the grinding chamber. By selecting different sieves, the particle size can be varied such that homogeneous samples are produced.	
Specifications	**Requirements**
General	Cyclone type bench top sample mill (Lab scale).
Grinding speed	Micro switch- based system with high grinding speed (10000 rpm) for the grinding of samples like grains, seeds, cereals, hard boiled confectionery etc
Grinding principle	Turbine and sieve
Grinding ring	Made of tungsten Carbide/Copper Impeller-standard (aluminum).
Sample volume	Should be able to grind samples with different moisture levels i.e. from 10% or less to 15%
Sample composition	Should be able to grind samples with up to 15% moisture and/or fat content up to 20
Final particle size	• Should have capability to grind sample size of up to 10 mm or more; • Should have grinding rate of ≥4g/sec • Should have provision for adjustable particle size; Should be supplied with Screen sieves for 0.5 mm, 2 mm, 1 mm, 0.8mm, • 0.3 mm should be provided for defined particle size There should be no/ minimum thermal degradation of the sample during grinding • Should be approved by AOAC for sample preparation for different purpose
Noise level	Low noise level of ≤75 dBA
Accessories	Sample bottles 100 to 125 ml and seal Accessory to enable pouring of samples into the milling zone Dust collection accessories Seal kit Minimum 50 sample bottles (UV protected) with sealing lids
Power requirements	230 V / 50 Hz – 230V/60Hz
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Calibration certificate	Calibration certificate for noise level and particle size from ISO17025 laboratory
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.

After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS/Stabilizer	Suitable rating UPS/Stabilizer
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

24. AUTOMATED SOLID PHASE EXTRACTION SYSTEM	
Application: The Solid Phase Extraction (SPE) performs automated rugged and reliable extraction and clean-up of large volume liquid samples for further analysis by LC-MS/MS, GC-MS/MS with positive pressure loading and elution of sample and solvents with parallel evaporation. Provides a high through put system for processing samples simultaneously	
Specifications	**Requirements**
General	It should be configured as module on x-y movement head line/rail/platform of Main Unit. Automated Solid Phase Extraction module should to carry out automated SPE steps: cartridge condition, sample loading, cartridge drying, and elution, elute evaporation and concentrating, reconstitutions and solvent exchange.
SPE cartridge station	The SPE process should be performed in a highly reproducible and reliable manner: It should have • Positive liquid displacement • SPE cartridges station for 1, 2, 3and 6ml • 1-3 ml and 6 ml SPE cartridge tray with more than 25 position • Tray holder for more than 3 sample trays of various size SPE cartridges • Gripper for plastic transport adaptors • Preparation syringes modules and 2.0 to 2.45 ml syringes 2 numbers • Supplied with more than 20 cartridges of 6 ml with adaptors • Solvent reservoirs 4 numbers of 1 L solvent bottles • Solvent filling station for four solvent positions of 1 L solvent reservoirs of each and two waste position • Sample vials of 2 ml, 4 ml and 10 ml • Elution collection vials 2 ml, 4 ml and 10 ml • SPE cartridge drying for complete solvent change • Evaporative concentration of the eluate, with or without adding keeper solvent
Solvent Evaporation module	• It should be configured as module on x-y movement head line/rail/platform of Main Unit. • It must be multi-position evaporation station to performs solvent evaporation and sample concentration. • Samples in standard vials can be evaporated /concentrated Controlled evaporation through user defined temperature (ambient to 100^{o}C), agitation (from 300 to 700 rpm) and defined vacuum (up to 60 mbar) levels with vacuum pump and condense enabling to flexible operation. Evaporation simultaneous 6 samples or more • Evaporation vial / tube capacity 10 ml vial (8ml volume), 4ml vial (3ml volume), 2 ml vial (1.2 ml volume)

Software	• System license software to control and programming all function and device/module under one software. • Software should be able to operate independently and should able to control and functions. • Software should have sample preparation Builder function for Solid Phase Extraction, Washing, Evaporation • Software should have built-in maintenance function, simplifying maintenance planning and improving the overall operation
Data processor	Windows based workstation with latest configuration: Monitor-20" or large display LCD based monitor with 4K-UHD resolution for software installation and instrument operation, data storage and analysis Should be along with latest licensed Window OS and other necessary software.
Accessories	Syringes 1000 µl compatible to system 5 no Syringes 10 ml compatible to system 5 nos Tray for 50 vials of 2ml 3 nos Sample Tray for 60 vials of 10 ml and 20 ml or 30 ml each 3 nos QuECheRS Cartridges for Food Matrices with high fat (500 No.) Matrices with high Water content and (500 No.) Matrices with high pigmented (500 No.) Tubing, adaptors, frits, joints, and any replaceable item for operation of system 5 sets
Power requirements	230 V / 50 Hz – 230V/60Hz
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Performance certificate	From at least two institution where same model has been installed in the previous 2 years
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.

After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable rating UPS (60 min back-up)
Quality Requirement	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Outage conditions	After two years of warranty period, 3 years of CAMC shall be undertaken by the supplier. This would also include: i. Preventive maintenance service: The seller will provide a minimum of two Preventive Maintenance Service visits during a year to the operating base to carry out functional checkups and minor adjustments/tuning as may be required. ii. Breakdown Maintenance Service: In case of any breakdown of the equipment/system, on receiving a call from the buyer, the seller is to provide maintenance service to make the equipment/system serviceable. iii. Response time: The response time of the seller should

	not exceed 48 hours from the time the breakdown intimation is provided by the Buyer. iv. Serviceability of 90% per year is to be ensured. This amounts to total maximum downtime of 37 days per year. Also, unserviceability should not exceed 2 working days at one time. Required spares to attain this serviceability may be stored at site by the seller at his own cost. Total down time would be calculated at the end of the year. If downtime exceeds permitted downtime 'Liquidated Damages' would be applicable for the delayed period. v. Maximum repair turnaround time for equipment/system would be 3 days. However, the spares should be maintained in a serviceable condition to avoid complete breakdown of the equipment/system.
Payment	Payment only after installation, validation and performance demonstration

25. MICROPIPETTES				
Application: Micropipettes are used to measure and deliver accurate volumes of liquid in any analytical measurement. These devices measure small volume, starting at 1 microliter, and are used in various laboratories, including food analytical laboratories				
Specifications	**Requirement**			
General	Liquid handling equipment, Autoclavable with high precision, robust and reliable			
Material of construction	Corrosion resistant piston and sealing material to allow smooth and uniform pipetting			
Pipette Tip Cone	Pipette tip cone should be universal type suitable for any make of microtips. Pipette tip cone should be removable for easy cleaning, maintenance and autoclaving.			
Operation	Effortless single hand operation of volume setting, volume lock, pipetting and tip ejection, all operations with the same hand			
Display	Should have 4-position display with an integrated lens for better display. Display always visible and facing the user.			
Sterilization	Completely autoclavable at 121 □C, 20 min without disassembly			
Volume Range and Quantity specified	Range	Quantity	Maximum permissible Systemic error (at 100% volume)	Maximum permissible Random error (at 100% volume)
	0.5-10 µL	2	□ 1%	□ 0.04%
	10-100 µL	2	□ 0.8 %	□ 0.2%
	100-1000 µL	4	□ 0.6 %	□ 0.2%
	2-20 µL	2	□1%	□ 0.3%
	20-200 µL	4	□0.6 %	□ 0.2%
	5-50 µL	4	□0.8 %	□ 0.35%
	10-500 µL	4	□0.6 %	□ 0.2%
Identification	Each pipette must have a individual identification number engraved and also have an individual labelling area.			
Accessories	Suitable Tips for all pipettes, Tip boxes Rotatable holder with Large rubber feet protection from liquids spilled on bench top to hold and for storing up to 6 pipettes in upright position: 4 Nos			
Calibration	3-point calibration certificate with Uncertainty measurement from ISO 17025 (NABL) accredited lab			
Manual	Each pipette should be accompanied with a manual and have pictorial representation of all operations, limitations and functions			
Warranty	2 years			
Service	Should provide annual service and calibration			

Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

26. ELECTROMAGNETIC SIEVE SHAKER	
Application: Traditional sieve analysis is the standard method for production and quality control of powders and homogeneity for reproducible results. To guarantee a high degree of reproducibility and reliability, sieve shakers with sieves of known mesh size are used.	
Specifications	**Requirements**
General	Sieve shaker with a maintenance-free electromagnetic drive for dry or wet sieving for test sieves 75µm, 125 µm, 150 µm, , 250µm, 300µm, and 500µm, along with assembly lid and receiver with 3D sieving effect and extremely smooth and quiet operation, short sieving times and high separation efficiency.
Design	Electromagnetic drive with 3D- sieving effect
Mode of Operation	Continuous and Intermittent
Number of sieves	Up to 8 sieves of 50 mm height
Shake Time	Programmable from 1min to 99 min
Noise Level	Less than 60 dB without sieves at maximum amplitude, Less than 70 dB with sieves and material at maximum amplitude.
Sieves	• Made from SS 316 with laser marking of specification & serial no Assembly lid and receiver should be of SS-316 material • Specially designed sieves without crevices to avoid trapping of sieving material and without Lead • Mesh is uniformly tensioned, welded and no soldering process involved. • Should have sturdy joint less rims for excellent fitment. • Supplier should provide the calibration certificate for each sieve • Should be manufactured in accordance with ISO 3310:1-2000 standards.
Display	16 x 2, character alphanumeric LCD
Net Weight	50 Kg without Sieves (Approx)
Calibration standards	Calibration certificate for mesh size of each sieve from ISO17025 accredited laboratory to be provided
Power requirements	230 V / 50 Hz – 230V/60Hz
Operating manuals, service manuals, other manuals	Should provide: - • User, technical and maintenance manuals in English language • List of equipment and procedures required for local calibration and routine maintenance • Service and operation manuals to be provided advanced maintenance tasks documentation, if any.
Recommendations or Warnings	Any warning signs would be adequately displayed
Performance certificate	From at least two institutions where same model has been installed in the previous 2 years
Warranty	2 years after satisfactory installation and working excluding consumable parts and accessories.

After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service • agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. • Should carry out yearly PM with at least one PM kit Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Training	The supplier should provide comprehensive training to users on operation of the instrument and application support onsite as per specifications
List of Spares and Accessories	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached
UPS	Suitable rating UPS/stabilizer (30 min back-up)
Quality Requirement	• Calibration certificate from ISO17025 accredited laboratory. Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
IQ/PQ/OQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

27. MICROFUGE	
Application: A compact bench top Mini Centrifuge for 96-well plates used for centrifuging plates before setting up for PCR, RT-PCR and protein estimation by ELISA.	
Specifications	**Requirement**
Base unit	Table top centrifuge with maintenance free brushless motor and have low access height, CFC free refrigerant LCD Digital Display of time, speed and Temperature and run conditions Compatible with plate rotors Automatic imbalance detection and cut-off Should be programmable with easy preset programs for fast temperature for pre-cooling and short spin. Should have motorized lid lock system & Automatic lid release Aerosol tight lid
Temperature range	-5ºC to 40 ºC
Speed	Maximum speed: 2000 rpm or better for 96 well plate r
Timer	Timer set up to 99 minutes
Rotors	Rotor for 2 x 96 well plate Rotor for 1.5ml with adapters for 0.2 ml
Power requirement	220 v to 240 v -50 Hz If a voltage stabilizer is required, it should be supplied along with the unit
Voltage stabilizer	Suitable voltage stabilizer to be provided
Certificates Performance and safety standards (specific to the device type); Local and/or international	Should be compliant with the requirements of FDA/CE/BIS Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements (or equivalent BIS Standard) Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
IQ/OQ/PQ	On site IQ, OQ of instrument along with document to be provided & supplier to assist till satisfactory PQ of instrument.
Service contract clauses, including prices	List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets (hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • List of equipment and procedures required for local calibration and routine maintenance; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation; • Certificate of calibration and inspection
Warranty	Warranty for 2 years after satisfactory installation and working excluding consumable parts and accessories.

Operation and maintenance training	The supplier will have to carry out successful installation at our laboratory premises (where ever the system has to be installed) and provide on – site comprehensive training for scientific personnel operating the system and support services till customer satisfaction with the system.
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

28. BOTTLE-TOP DISPENSER				
Application: Bottle-top dispensers are used for safe dispensing of different volumes of concentrated acids and corrosive chemicals from a bottle safely and reliably, without contamination from the reagent bottles for use in laboratory				
Requirement	**Specification**			
General	For free dispensing of concentrated acids such as HNO_3, HCl, HF, H_2SO_4, and liquid H2O2 Simple single-hand usage			
Material	Metal-free construction Corrosion resistant components for high concentrated acids (also HF) Reproducibility for base solutions			
Types of bottle dispenser	Type Analog, variable volume	Range of volume to be dispensed (mL)	Volume increment (mL	Accuracy Full scale
	1-10 mL	1-10 mL	0.25 or less	≤ ±0.5%
	10-50 mL	10-50 mL	1.0 or less	≤ ±0.5%
	50-100 mL	50-100 mL	1.0 or less	≤ ±0.5%
Safety features	Dispenser should have recirculation valve to ensure safety during dispensing. The end of the discharge tube should have a hinged cap to avoid dripping after dispensing.			
Working temperature range	Dispensers should be suitable to work in 20-40 □C temperature range.			
Calibration certificate	Calibration certificate from ISO 17025 Laboratory according to ISO 8655 standards.			
Accessories	A calibration tool for in-lab recalibration Adapters that comfortably fit most laboratory reagent bottles (28 mm, 32 mm, 38 mm, 40 mm and 45 mm). Heavy Duty Acid resistant gloves			
Quality Requirement	Should be compliant with the requirements of FDA/CE/BIS Should provide calibration certificates from NABL accredited agency every year during warranty & CMC period. Calibration cost will have to be borne by the supplier.			
Warranty	Warranty for 2 years, extendable up to 3 years, after satisfactory installation and working excluding consumable parts and accessories.			
Service Support	Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer			
Training	The supplier will have to carry out successful Installation at the laboratory premises (where ever the system has to be installed) and provide on-site comprehensive training for a minimum of two scientific personnel operating the system till customer satisfaction			

After sales service/ Post warranty	• Contact details of manufacturer, supplier and local service agent to be provided, including toll free/ Landline Number; • Should have a good after sales service/technical support capable of reaching at short notice the places where instrument is installed. • Visits and unlimited breakdown calls by service/application support, engineers should attend immediately without fail. Should carry out yearly PM with at least one PM kit • Comprehensive AMC cost/rate for 3 years after warranty shall be quoted. Terms and conditions for the comprehensive AMC, after the warranty period has to be specified
Compliance statement	The quote should also include a compliance statement vis-à- vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

29. HOT AIR OVEN (For Drying Glassware)	
Application: For drying glassware and also for conditioning of heat sensitive microbiology media and to provide an optimal, homogeneous, temperature uniformity and stability to ensure drying is complete	
Specifications	**Requirement**
Material of construction	• Should have double walled construction, with high quality insulated steel. Inner walls of 304 qualities SS, Outer walls of Epoxy Powder coated GI sheets/textured SS. • Facility for adjustable shelves, 8-10 removable shelves to be provided. • With internal lighting facility, Insulated door fitted with heavy hinges, mechanical door lock.
Capacity	200-600 L
Temperature range	• Temperature should be thermostatically controlled • It should be Ambient +5°C to 250°C with temperature setting accuracy ±0.5 °C with forced air circulation for temperature uniformity • Separate PT 100 sensor and display for temperature (LED/TFT) • Safety alarms
Unit	• Air ventilators to be provided on both side • The equipment should be provided with microprocessor controlled digital display • Temperature homogeneity between top and bottom shelves should be maintained by forced Circulation • Certificate from an ISO 17025 accredited lab for 3 different temperature points
Power supply	All electrical peripherals required for smooth functioning e.g. voltage stabilizers should be provided.
Accessories	Should have all the accessories required for the functioning of the equipment.
Certificates Performance and safety standards (specific to the device type); Local and/or international	• Should be compliant with the requirements of FDA/CE/BIS • Electrical safety conforms to the standards for electrical safety IEC 60601- General requirements(or equivalent BIS Standard) • Certified to be compliant with IEC 61010-1, IEC 61010-2-40 for safety
Supplier/ Manufacturer	Must be ISO certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
Recommendations or warnings	Any warning signs would be adequately displayed

Warranty	Warranty for 3 years after satisfactory working excluding consumable parts and accessories.
Service contract clauses, including prices	• List of all spares and accessories (including minor) with part numbers and price, required for maintenance and repairs in future after guarantee/warranty period should be attached;
Operating manuals, service manuals, other manuals	Should provide 2 sets(hardcopy and soft-copy) of:- • User, technical and maintenance manuals to be supplied in English language along with machine diagrams; • Service and operation manuals (original and copy) to be provided; • Advanced maintenance tasks documentation;
Supplier/ Manufacturer	Must be ISO 8655 certified for quality
Service Support Contact details (Hierarchy Wise; including a toll free/landline number)	Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/adhoc) to be declared by the manufacturer;
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a “tabular form” clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Payment	Payment only after installation, validation and performance demonstration

30. DOUBLE DOOR (SIDEBY SIDE) REFRIGERATOR	
Application: A refrigerator is used for storing reference cultures, media, homogenized samples, reagents etc	
Specifications	**Requirement**
Material	Stainless steel
Capacity	Approx. 500 L and above
Adjustable Shelves	Tempered glass shelves 05 No.
Doors	Two Stainless steel doors side by side Refrigerator and freezer must be side by side
Temperature Range	Independent Digital display and temperature controls for refrigerator and freezer Refrigerator $+2^{o}$ to $+8^{o}$C Freezer -15 to -20 ^{o}C
Audio alarm	Alarm if door is ajar for long
Inner body	Rust Free Material
Refrigerant	CFC / HCFC Free
Frost Free	In built Voltage Stabilizer Warranty 2years and Life time on motor
Door Lock & Interior light	High/Low cut with timer delay
Temperature Control	Same Temperature: Top to Bottom Microprocessor based Temperature Controller with Digital Display
Compliance statement	The quote should also include a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, if any supported by technical literature. This statement must be signed, with the company seal, for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification.
Warranty	2 years after successful installation and 10 years for the compressor
Payment	Payment only after installation, validation and performance demonstration

FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

Ministry of Health and Family Welfare, Government of India

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New Delhi-110002, Tel: 011 23220993