

## IIT-Bombay develops plastic-like films for packaging industry

Jan 20, 2020

**Snehal Fernandes**

In an effort to counter plastic pollution, the Indian Institute of Technology – Bombay (IIT-B) has developed plastic-like films for the packaging industry that can degrade into harmless components.

The institute has developed a product that is a combination of non-toxic, edible sugar-based or fat-based biopolymers approved by the Food Safety and Standards Authority of India that can degrade in about a week or a month.

Researchers said at present high-density polyethylene (HDPE) is the standard non-degradable plastic barrier film, used for both consumer goods and food, by most packaging industries in India and overseas.

Those making a switch to environment-friendly alternatives opt for sugarcane bagasse or starch containers or imported biodegradable barrier films made of polylactic acid (PLA).

HDPE is made from petroleum which is a non-renewable source. The monomer for PLA is usually derived from renewable sources such as corn starch, tapioca roots or sugarcane, but is three times the cost of the standard HDPE films.

“Developing biodegradable alternatives to plastic is a major need since single-use plastic has become a global challenge in terms of environmental hazards,” said Rinti Banerjee, Madhuri Sinha Chair Professor, department of biosciences and bioengineering.

According to the United Nations Environment Programme, plastics take more than century to degrade in the environment.

Globally, 50% of consumer plastics are designed to be used only once, and 10% plastic waste is generated via domestic consumption. Only 9% of all plastic ever produced is being recycled.

Describing their work as a conscious spin-off, Banerjee said, “We have been developing non-toxic materials and technologies for various medical applications that have to degrade in the body, and therefore felt our knowledge of biomaterials can address the need of biodegradable alternatives to plastic that can be degraded completely and are also suitable for reuse.”

For the last two years, they have developed different kinds of primary film-based plastic packaging that can degrade from a week to a month. The plastic film’s transition from being transparent to translucent based on the composition of the polymers.

The low-cost invention comprises films three times the tensile strength of the HDPE films and six times that of PLA films . This is nearly one-third the cost of PLA films, said Banerjee.

A patent for technology development and composition of the biodegradable material has been filed and at present, the technology is being scaled up.

Scaling up of the manufacture of the biodegradable films with a Chennai-based packaging company is underway.

In its first phase, the product will focus on primary packaging of fast-moving consumer goods, which will then extend to packing solid perishables such as fruits and vegetables, and finally for liquids such as pouches of milk and juices.

“We need to have alternatives to plastics, especially single-use plastic. The alternatives should be sustainable, using natural materials and those which produce natural intermediates upon degradation” said Anjali Parasnis, associate director, western regional centre, The Energy Resource Institute, who is not involved with the work.