Maize a New Alternate Material to Conventional Plastic

-Chander Mohan

India's third most grown grain is Maize, after rice and wheat. India was the seventh largest producer in the year 2018, marginally ahead of Mexico, one of maize's centres of origin. In the beginning basically most of it goes for animal feed and industrial use, like making starch and industrial alcohol. But dishes are made from it across India, like Punjab's hearty make-ki-Roti and Sarson ka Saag.

The domesticated crop originated in the Americas and is one of the most widely distributed of the world's food crops. The Corn or maize is a cereal plant of the grass family (Poaceae) and its edible grain.

The Corn is used as livestock feed, as human food, as biofuel, and as raw material in industry. The Agro products that are deemed unfit for human consumption utilized for other useful products. Such useful product is an alternative to plastic made from the biopolymer from the corn starch.

Biopolymers are 2.5 times costlier than plastic products but where it can score is that you cannot produce a plastic bag less than 50 microns. On the other hand, we can produce a biopolymer bag of 20 microns.Though the micron level is lower, these biopolymers are stronger than the plastic bags. A50micron conventional polybag made of plastic can normally hold products up to two kg. The biopolymer bags can hold products up to five kg.

Biopolymer

As informed by Mukul Sareen, Director, Business Development, Hi-Tech International, Manesar, an

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industrial hub of the Gurugram (Haryana) a technology sourcing provider in the field of plastics and packaging, has come out with a plant-based bio-compostable polymer. The biopolymer, made from corn starch, can replace single and multiple-use plastic products.

The biopolymer is produced by converting the corn starch into a granule. “We buy starch from the mills and go in for polymerization through a blending process. This helps us to get polymer granules the way some petrochemical firms produce plastic granules,” Sareen added.

Corn starch polymers are polymers that are made from alkenes that are mixed with corn starch. This makes them easily biodegradable and can therefore be used as an eco friendly alternative to petrochemical based plastics.Bioplastics are also known as organic plastics, as it is derived from renewable biomass sources such as corn. Bioplastics can be made from agricultural byproducts or agri waste and is a great way of how to reduce a carbon footprint. Renewable biomass sources, like vegetable oils and fats, corn starch, straw, recycled food waster, wood chips and sawdust, are used to produce bio plastic materials.

Synthetic polymer materials on the other hand, are produced from petroleum, which can be expensive, depending on the price of oil and of course, it is not sustainable. Corn is the cheapest available source of commercially available sugar, and also the most abundantly available. Corn starch plastic has become very popular as a replacement for traditional plastics as it is more environmentally friendly.

Rampant wastage

From these granules, the Gurgaon-based firm, established in 1985, produces bottles, cups, trays, polybags and other such materials. “Corn starch makes up 60-70 percent of our product. We also use biomass to manufacture our products,” he further said.

The biopolymer product getting the mandatory clearances from the authorities is significant since India alone produces 9.46 million tonnes of plastic waste every year. At least 40 per cent of this remains uncollected. The problem with this waste is some 43 percent is used for packaging and most are for single-use.

Sareen further added that the bio-compostable polymer, branded as Dr. Bio, has received the approval of the Institute of Petrochemicals Technology (formerly Central Institute of Petrochemicals Technology Engineering and Technology) after tests. “Our product, India's first, was approved only after it was found to be compostable. Ours is the only Bureau of Indian Standards (BIS) approved biopolymer film.”

The polymer is having Corn starch as the main ingredientwhich is biodegradable. It is 100 percent compostable and can replace plastic bottles, straws, cups, disposable cutlery and polybags. ■

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