The future of plastic? Scientists explore bioplastics from sorghum

By Sahana Ghosh

- Indian scientists are working on a plant-based alternative to fossil fuel-derived plastics, by using the dryland crop plant sorghum and a few microbial strains.
- The researchers have developed a sorghum that is far more effective for biomass-based plastic and will be much cheaper and more sustainable than plastic.
- Going forward, it is the era of ‘green technologies’ and irrespective of the cost considerations, bioplastics need to be adopted, an expert said.

In the early 1940s, Henry Ford experimented with making plastic parts for automobiles. He came up with what was called the “plastic car made from soybeans.”

Since that decade, when mass plastic production began from oil-based materials, its use has surged dramatically, becoming a big part of our daily lives. The resulting unwanted plastic pollution crisis and awareness of depleting fossil fuel reserves has driven research toward alternative, sustainable materials.

Extending the hunt for sustainable materials as an alternative to fossil fuel-derived plastics, Indian scientists at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) are working with the humble drylands crop plant sorghum (jowar) and a bunch of microbial minions to help shape a bio-based plastic future.

Commonly used bioplastic feedstocks (raw materials) are: cellulose, starch, glucose and vegetable oil. “We need a good amount of feedstock. Sorghum is a rich source of starch like corn and potato. Starch based edible cutlery is popular across the world,” A. Ashok Kumar, sorghum breeder at ICRISAT, told Mongabay India.

For example, Bakeys, a Hyderabad-based company produces edible spoons made by baking a dough consisting primarily of sorghum (Sorghum bicolor), with some additional wheat and rice flour. A start-up in the Czech Republic is experimenting with producing an edible coffee cup composed of a cereal-based crisp waffle.

“Currently people are using sugarcane bagasse as source material for bioplastic but here we have developed a sorghum that is far more effective for biomass-based plastic and will be much cheaper and more sustainable,” Ashok Kumar said. He was referring to sorghum cultivars (RVICSH 28 and ICSV 18542) that have high biomass yields and more ratoonability (yielding more than one harvest from a single planting) making them amenable for crafting into bioplastics. Read more