

Biodegradable Packaging Materials

Excessive usage of plastics accompanied by its relatively low cost and easy availability started an era popularly known as the age of “throw away living”, where plastics are indiscriminately thrown after its single use. This has resulted in accumulation of plastic waste everywhere, which is disturbing and damaging the earth’s ecosystem. Govt of India introduced Plastic Waste Management Rules, 2016, prohibiting identified single use plastic items. Recently the Ministry of Environment, Forest, and Climate Change (MoEFCC) also released guidelines to phase out single use plastics vide the Plastic Waste Management (Amendment) Rules, 2022. As an alternate to non-degradable single use plastics, Defence Food Research Laboratory (DFRL), Mysore has developed a technology to make biodegradable packaging materials (Carry Bags), which decomposes in a specific environment such as water, soil, compost etc under a short period of time.

DFRL-DRDO has developed Biodegradable Packaging Materials technology. This technology is mainly focused on the utilization of biodegradable and compostable polymers such as



Polybutylene Adipate co- Terephthalate (PBAT), Poly Lactic Acid (PLA), starch etc for the production of flexible films for applications such as carry bags, pouches, bags etc. A suitable formulation was developed which can be blown into films using extrusion film blowing technique. The physico-mechanical properties of the film were carried out using a tensile tester as per to ASTM D 882 and found to have sufficient strength for using in carry bag applications. These films were tested for their biodegradability and found to meet the BIS standard for compostable plastics. A soil burial test was conducted, where three samples were found to gradually disintegrate and the biodegraded within the stipulated time period. During the process, erosion holes were first observed in the sample followed by breaking down into residual fragments. Later the film completely disappeared, indicating complete biodegradation of the film. Weight loss percentage was also recorded during the test period.

The technology is amenable for bulk production with varied thickness as per the end user requirement. Any existing carry bag manufacturer can use this technology to manufacture compostable and environmentally friendly films and carry bags. Considering the widespread usage of single use plastics in various fields, biodegradable and compostable plastics are having the potential to replace existing non degradable plastics. There is a growing demand for biodegradable plastics, which degrade in the environment, to establish a more sustainable society and to solve our environmental and waste management problems.