

For Food Or Plastic? Using Starch For Biodegradable Plastic

University of Jaffna



Non-biodegradable plastic has become a common sight in ecosystems, as plastic bags and straws escape landfills, and the litter parks and floats in the ocean's water. To address this, the Faculty of Agriculture and Faculty of Technology at the University of Jaffna developed an innovative solution: 100% biodegradable plastic, namely, Cellulose Reinforced Thermoplastic Starch Bio-Plastic. This groundbreaking material represents a significant step toward reducing plastic waste and protecting our ecosystems.

Cellulose Reinforced Thermoplastic Starch Bio-Plastic is a sustainable plastic consisting of palmyrah starch, fishtail palm starch, cornstarch and coconut husk fiber – all biodegradable materials. The material sources three distinct starches – an approach previously unexplored in bioplastic development. For structural support, the plastic also contains glycerol, citric acid and gelatin, resulting in a more formidable material than traditional plastic.

In addition to the structural advantage over traditional plastics, there are physicochemical benefits. Since the plastic is 100% biodegradable, it decomposes naturally, which alleviates strain on the environment. Instead of lingering in the environment, its decomposition decreases the possibility of an animal ingesting the plastic and harming it. The

biodegradable plastic benefits humans as well, avoiding the use of petroleum that seeps from plastics when sitting in the environment.

The innovative concept of starch plastic originated from the collaborative efforts of Dr. Subajiny Sivakanthan (Faculty of Agriculture), Sathiska Kaumadi (Faculty of Technology) and their dedicated team. This groundbreaking idea evolved into a proposal for an undergraduate research project. Seeking support, the team approached UBL-Jaffna, the technology transfer office at the University of Jaffna. Since then, UBL-Jaffna has become a pivotal partner, providing invaluable resources and assistance. They have supported the team in securing funding to advance the invention's Technology Readiness Level (TRL) from 3 to 6 and support for filing a national patent under the guidance of Prof. T. Eswaramohan (Director) and Mr. S. Anurakavan (Manager)..



Cellulose Reinforced Thermoplastic Starch Bio-Plastic was the first sponsored research agreement signed at University of Jaffna. The technology has been licensed to MRK Associates, Ja Ela, one of the oldest and largest plastic manufacturers in Sri Lanka. Currently, the commercialization of biodegradable plastic has a pending status as the minimum viable product undergoes testing involving its degradability.

The licensing agreement between UBL-Jaffna and MRK Associates creates an optimistic future for biodegradable plastics. As research on this topic continues at the University of Jaffna, Cellulose Reinforced Thermoplastic Starch Bio-Plastic brings us closer to a reality where plastic waste no longer plagues the ecosystem – providing a greener and cleaner environment.

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