MAURITIUS RESEARCH AND INNOVATION COUNCIL (MRIC)

RESEARCH AND INNOVATION BRIDGES (RIB)

Project Summary

Title of Project: Turning sugarcane trash into bioplastics: pilot-scale demonstration
Mauritian Company: Omnicane Ltd
Main Collaborating Institution: Queensland University of Technology (QUT), Australia
Co-Project Leaders: Dr J C Autrey Dr A Salem Saumtally Dr Mark D. Harrison
Collaborators: Dr Asha Dookun-Saumtally, Mr Gunshiam Umrit, Mrs Karuna Mulleegadoo, Dr Tesha Mardamootoo

Technical Abstract

The current revenue base of the sugarcane industry consists of raw and refined sugar, ethanol from molasses, and electricity from bagasse. There is a clear need for the sugarcane industry to diversify its revenue base to remain profitable despite fluctuations in the sugar price.

The poly-3-hydroxyalkanoate (PHA) family of polyesters can be converted into bioplastics with diverse material properties. All PHAs are biodegradable and biocompatible, but one PHA, poly-3-hydroxybutyrate (PHB), is particularly suited for high-value medical applications. MSIRI has developed a process to convert sugarcane trash into sugars, transformation of those sugars into PHB using *Cupriavidus necator*, and recovery of PHB at high purity. This is the first demonstration of PHB production from sugarcane trash.

MSIRI is currently optimizing laboratory-scale production to achieve maximum yield of PHB per unit mass of sugarcane trash. *Scale-up of the process to pilot-scale is essential to validate the industrial application of the technology and evaluate the economics of commercial-scale production, but pilot-scale facilities for the pretreatment of sugarcane trash and fermentation are not available in Mauritius.* Therefore, the proposed project will deliver pilot-scale demonstration of sugarcane trash valorization into PHB at Queensland University of Technology (QUT) Mackay Renewable Biocommodities Pilot Plant (MRBPP).

Key Words: sugarcane, trash, hydrolysate, fermentation, polyhydroxyalkanoate, bioplastic, pilot-scale