

2016 SATU Joint Research Scheme Program Host Application Form

Date: 2016 / 04 / 25 (year/month/day)

1. Host University

University of Malaya

2. Host Unit

Mechanical Engineering

3. Joint Research Project Title

Development of High Performance Biopolymer from Vegetable Oils

4. Principal Investigator

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5. Co- PI from the same unit – If any

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6. Project Details

Project Description	The use of sustainable and biodegradable resources in the preparation of diverse industrial materials such as organic coatings has been revitalized due to emerging environmental challenges faced by today's world. Plant oils are considered the most available and renewable resource material, capable of replacing the petrochemical, used in the preparation of most polymeric materials. This project focuses on the
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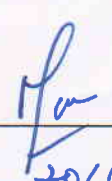
SATU Presidents' Forum

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study of several different vegetable oils, various polymerization techniques for production of greener materials with the potential of replacing harmful petroleum-based polymers. The objectives of the study is to develop new biobased thermosetting polymers from vegetable oils as renewable resources. In this study, various kind of epoxidized vegetables oil are used as the starting material for being ring-opened by methanol and glycol, followed by saponification to prepare fatty acids. These fatty acids and epoxidized vegetable oil are then used for ring-opening reactions with catalyst to generate polyols with varying OH numbers. The effect of OH number of polyols on the mechanical and thermal properties of polyurethanes is investigated. The bio-based polyols are also prepared from heat-bodied vegetable oil followed by ozonolysis. The produced polyols are studied in stage 3 to produce polyols with primary hydroxyl groups with high reactivity, which could find valuable uses in polyurethane applications. Thus, these studies will not only further the fundamental understanding of the behavior of vegetable oils, but they suggest novel types of sustainable value-added applications in materials science beyond the classic thermoset applications. The average molecular weight and viscosity was measured. Thermo-mechanical testing are analyzed using, TGA, DSC, DMA and universal tensile tester. The ramp-hold tensile tests are used to characterize the time dependent mechanical properties of aforementioned biopolymer films. The characteristic and properties of samples are studied and their beneficials in processability and in applications of biobased polymers are considered.

7. Acknowledgement (Signed by the President or SATU representative to show recognition)

Name	
title	PROFESSOR DR. NOORSAADAH ABD. RAHMAN Deputy Vice-Chancellor (Research & Innovation) University of Malaya 50603 Kuala Lumpur
	 (signature)
Date:	28 / 4 / 2016 (yyyy/mm/dd)

Please email satu@email.ncku.edu.tw before 2016.4. 29(Fri.) for application with the subject line: < 2016 SATU JRS host application –School Name>. Thank you.