

**EXTRACTION OF SUPERHYDROPHOBIC WAX FROM *Nelumbo Nucifera* AS
WATER REPELLENT FOR CAR WINDSCREEN**

NUR SYAZA NATASYA BINTI NOR HISHAM

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Dr. Non Daina binti Masdar
Supervisor
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Madam Salamiah binti Zakaria
Co-Supervisor
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Dr. Siti Nurlia Binti Ali
Project Coordinator
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau,
Perlis

Dr. Nasulhah Binti Kasim
Head of Programme
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau,
Perlis

Date:

ABSTRACT

EXTRACTION OF SUPERHYDROPHOBIC WAX FROM *Nelumbo Nucifera* AS WATER REPELLENT FOR CAR WINDSCREEN

Water repellent properties for car windscreen is important to avoid car accident due to heavy rain consequences. Water repellent glass (WRG) which is a transparent coating film fabricated onto glass that made of perfluoroalkyl and polyfluoroalkyl substances (PFAS), tetraethylorthosilicate (TEOS), polydimethylsilicone (PDMS) and fluorocarbon. The WRG prevent water droplets from sticking and attached to car windscreen. Current contact angle for most of WRG is just 100° which means water stay on the car windscreen before it slides away. This situation interrupts the driver's vision during heavy rain and may result in a car accident. Hence, new properties of water repellent from plant are investigate which are believed will provide higher contact angle. *Nelumbo nucifera* or Lotus plant are well known because of its leaves which has superhydrophobicity properties. The epidermis layer of lotus leaf has high density of papillae with small diameters that able to reduce contact area with water drops. This papillae is coated with unique chemical composition of wax tubules that consist of non-polar methyl group which discourage leaf-water interaction of higher water repellence. Since the lotus leaf extracts exhibit superhydrophobicity properties, it can be used to improve the water repellence on car windscreen as it contains wax tubules in which it has the mixture of aliphatic compounds such as nonacosanediols and nonacosan-10-ol. This superhydrophobic coating films can be used as a replacement for current practice car windscreen since it is fluorine-free coating which is safe to environment. Maceration is an attractive method to extract the wax tubules from the lotus leaves. The extract is then added into the Al_2O_3 stock solution as coating materials. This study aims to extracts wax tubules from lotus leaf by using maceration method. The superhydrophobic Al_2O_3 thin film were characterized using Fourier transform infrared spectroscopy (FTIR), Scanning electron microscopy (SEM) and UV-Visible spectroscopy. The sol-gel method will be used to homogenised the Al_2O_3 mixture before mixed with the lotus leaf extracts to produce the superhydrophobic thin film. Al_2O_3 thin film mixed with lotus leaf wax as water repellent agent exhibits several interesting properties, such as high water repellency, large water contact angle and high optical transparency.

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