

**EXTRACTION AND CHARACTERIZATION OF
MICROCRYSTALLINE CELLULOSE FROM
DIFFERENT TYPES OF FRUIT PEELS**

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This Final Year Project Report entitled “**Extraction and Characterization of Microcrystalline Cellulose From Different Types of Fruit Peels**” was submitted by Rabiatul Jannah Binti Kamarul Nazli in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry with Management, in the Faculty of Applied Science and was approved by

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ABSTRACT

EXTRACTION AND CHARACTERIZATION OF MICROCRYSTALLINE CELLULOSE FROM DIFFERENT TYPES OF FRUIT PEELS

Lignocellulosic biomass is still being thrown away which can contribute to greenhouse gas emission by burning without converting into a various value-added product. This study aims to investigate the extraction process of microcrystalline cellulose (MCC) from different types of fruit peels such as mango (*Mangifera indica L.*), papaya (*Carica papaya L.*) and banana (*Musa sp.*) peels by using alkali, bleaching and acid hydrolysis treatment. Cellulose and MCC were characterized by physical analysis such as Attenuated Total Reflectance-Fourier Transform Infrared Spectroscopy (ATR-FTIR), Scanning Electron Microscopy (SEM) and Optical microscopy. In addition, cellulose and MCC were also characterized by physicochemical analysis such as water solubility, purity as well as starch and dextrin test. The percentage yield of cellulose obtained from mango, papaya and banana peels are 6.50%, 12.74% and 13.14%, respectively. Meanwhile, the percentage yield for MCC from mango, papaya and banana peel are 51.99%, 52.57% and 38.12%, respectively. The physical appearance of mango, papaya and banana peels before and after chemical treatment indicates that the hemicellulose and lignin were successfully removed. The water solubility of MCC of mango peels (MCCMP) is the most soluble in water with 49.15% and commercial standard MCC is the least soluble in water with 21.23%. The water solubility of MCC of papaya peels (MCCPP) and banana peels (MCCBP) were 41.79% and 42.11%, respectively. The purity of MCCMP, MCCPP, MCCBP and CMCC are 28.70%, 10.78%, 18.52% and 25%. MCCMP, MCCPP, MCCBP and CMCC solutions changes colour to brownish-orange colour instead of blue which determines that they do not contain starch and dextrin. The presence and absence of functional groups of MCC were successfully identified by ATR-FTIR. The morphology of MCC were successfully observed by SEM and Optical microscopy.

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