

CELLULOSE AS A VERSATILE SOURCE FOR BIOPRODUCTS

Mochamad Chalid^{1*}

¹*Green Polymer Technology Laboratory, Department of Metallurgical and Materials Engineering, Universitas Indonesia, Kampus UI, Depok 16424, Indonesia, Phone +62 21 786 3510*

** m.chalid@ui.ac.id*

Biomass is a renewable source from living plant and animal materials, like cellulose. It has been identified as an attractive source of some products for starting materials such as macro fibres, micro fibrillated cellulose (MFC), nano crystalline cellulose (MCC), fibrillated cellulose (NFC) and nano crystalline cellulose (NCC) for a wide range of material products. Cellulose is a polymer as a versatile multi-purpose building block due to the presence of three hydroxyl groups for each 'mer' that leads to be functionalized into raw materials for polymers and chemicals, used in various products such as reinforcement agent for composite, nucleating agent for plastic products, construction material, shape memory material, actuator in biomimetic application, solid membrane for battery. Celluloses are being used as potential applications because of so many advantages such as abundantly available, low weight, biodegradable, cheaper, renewable, low abrasive nature, interesting specific properties, and exhibit good mechanical properties. Unfortunately, cellulose have some disadvantages such as moisture absorption, quality variations, low thermal stability, and poor compatibility with the hydrophobic materials, such as polyolefins. Within this study, the extraction of cellulose from natural fibres were performed by chemical treatments such as alkalinization, bleaching and hydrolysis. Furthermore, the study was carried out by functionalizing extracted celluloses through physical treatments such as plasma and steam explosion for comparison with chemical treatment to improve their properties which are suitable to their applications.

Keywords: *biomass, natural fiber, cellulose, extraction, functionalization, chemical, plasma*