PRODUCTION OF CELLULOSE-BASED SUPERABSORBENT POLYMER FROM WATER HYACINTH
(Eichhornia crassipes)

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ABSTRACT

MENOR, KENNY LOUIE M., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Munoz, Nueva Ecija Philippines, March 2023, **PRODUCTION OF CELLULOSE-BASED SUPERABSORBENT POLYMER FROM WATER HYACINTH (*Eichhornia Crassipes*)**

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Renewable resources from natural polymer such as cellulose from water hyacinth was used to synthesize and produce super absorbent polymer. The isolation of cellulose from water hyacinth was done through refluxation and bleaching process which was then use for the creation of superabsorbent polymer. The characterization of the synthesized SAP was done through observation and calculation method was done in getting its water absorption. An experiment was conducted to see the difference in terms of water absorption between the cellulose-based SAP from water hyacinth and petroleum-based SAP from feminine pad and diaper. The extracted cellulose from water hyacinth was mixed with sodium carboxymethyl cellulose and aluminum sulfate to produce superabsorbent polymer. The physical properties of the shredded SAP were observed to be light yellow to white and color, odorless, hard and brittle texture, lightweight, and flake to sugar-like structure. The SAP was tested for its water absorbency by immersing it on water for 5 mins. Results of this study revealed that increasing amount of isolated cellulose applied for the synthesis and production of SAP increases the water absorbency by a rate of 600-900% more than its initial weight. The water absorbency of SAP from water hyacinth was also compared against petroleum-based SAPs like feminine pads and diapers. The results showed that

SAPs from feminine pads and diapers has water absorbency of 2462% and 6343.33%, respectively, which is expected due to their chemical stability. The produced SAP from water hyacinth costs 1680.21 which is cheaper than commercially available synthetic SAP. With their far below expected absorption capacity, cellulose-based SAPs are environmentally compatible with soil and plants and does not have any adverse effects when applied and does not release harmful by-products unlike petroleum-based SAPs. The depleting and toxic nature petroleum-based polymeric materials gives rise to the use of renewable resources like biopolymers as polymeric material in water irrigation, tissue engineering, and bio-ethanol production.

Keywords: cellulose, petroleum, SAP

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