

Carboxymethyl cellulose from Waste Nata De Coco toward High Value Added-Application

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Bacterial Cellulose (BC) extracted from waste nata de coco, industrial residue from the production of commercial nata de coco, was used as the raw material for the production of carboxymethyl cellulose (CMC). CMC is the most important cellulose derivative for various industrial applications such as foods, pharmaceuticals, cosmetics, textiles, and paper. The various properties of CMC depend on the degree of substitution (DS) of carboxyl content along the polymer chain. In the present study, BC extracted from waste nata de coco was then processed to synthesize CMC through carboxymethylation using sodium hydroxide (NaOH) and monochloroacetic acid (MCA) under heterogeneous condition. The carboxymethylation reaction was optimized against the NaOH concentration, MCA concentrations, reaction temperature and reaction time. DS was determined with respect to the reaction conditions using a chemical method. Characterization of cellulose and CMC were carried out by analyzing the spectra of FTIR, XRD patterns, and FE-SEM micrographs. Finally, the optimized CMC, good water soluble with optimal DS of 0.7 to 0.8, was incorporated in the beverage; rice milk, and observed for its stabilizing effect. This study will be beneficial for food industries to help convert industrial waste to be more valuable products and reduce the imported chemical expense.

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