

Synthesis and characterization of carboxymethyl cellulose from palm kernel cake

Abstract

Carboxymethyl cellulose (CMC) is one of the important cellulose derivatives in industries, which is widely used as anti-caking agent, emulsifier, stabilizer, dispersing agent, thickener, and gelling agent. The main raw material of cellulose derivative is cellulose from wood and cotton linter. However, deforestation and acceleration of greenhouse effects gradually grown interest on agriculture products and by-products as alternative cellulose resources. Palm kernel cake (PKC) is an abundant agriculture by-product which consists of 20-30% cellulose. It is significantly considered as one of the alternative secondary resource for cellulose. In this work, cellulose is extracted and recovered from palm kernel cake and then converted to CMC. Acidified sodium chlorite process was applied to extract the cellulose from PKC. Carboxymethyl cellulose was then prepared using cellulose from acidified sodium chlorite process. 65.66% of cellulose was produced from PKC using acidified sodium chlorite process. By using the optimum carboxymethylation condition for pure cellulose, the result showed that degree of substitution (DS), product yield and viscosity for CMC were 0.67, 1.6475g/g and 66.6cP respectively.