

Esterifikasi Asam p-Hidroksi Benzoat Dengan Glukosa Menggunakan Katalis Heterogen Alumina

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Abstrak

Esterifikasi senyawa fenolik seperti asam p-hidroksi benzoat dengan glukosa diharapkan dapat menghasilkan ester yang memiliki aktivitas antioksidan. Reaksi esterifikasi berlangsung lambat, oleh sebab itu dibutuhkan katalis asam untuk mempercepat reaksi.

Pada penelitian ini mempelajari katalis $\text{-Al}_2\text{O}_3$ yang diimpregnasi dengan asam protik H_2SO_4 dan HClO_4 . Katalis heterogen $\text{-Al}_2\text{O}_3/\text{SO}_4$ dan $\text{-Al}_2\text{O}_3/\text{ClO}_4$ dikarakterisasi dengan XRD, XRF, BET. Reaksi esterifikasi menggunakan dua pelarut yakni aseton pada suhu 550°C dan dimetil sulfoksida (DMSO) pada suhu 1000°C dengan periode waktu reaksi 1 jam sampai 24 jam. Produk reaksi esterifikasi dianalisis menggunakan HPLC dan LC-MS.

Analisis LC-MS menunjukkan bahwa produk ester memiliki berat molekul 300, 420, 540. Aktivitas antioksidan menggunakan metode 1,1-difenil-2-pikril hidrazil (DPPH) menunjukkan produk ester memiliki IC_{50} 282 ppm.

.....Esterification of phenolic compound, such as p-hydroxy benzoic acid with glucose can be expected to produce ester products, which have antioxidant capacity. Esterification reaction rate is normally very slow and it needs acid catalyst to accelerate the reaction.

This research studied the catalyst performance of $\text{-Al}_2\text{O}_3$ impregnated with protic acids H_2SO_4 and HClO_4 . The heterogeneous catalysts, $\text{-Al}_2\text{O}_3/\text{SO}_4$ dan $\text{-Al}_2\text{O}_3/\text{ClO}_4$ were characterized by XRD, XRF, and BET methods. The esterification reactions were conducted using two kinds of solvents, in which reactions with acetone were conducted at a temperature of 550°C whereas with dimethyl sulfoxide (DMSO) were conducted at temperature of 1000°C , for a reaction period from 1 hours up to 24 hours. The reaction product were analyzed using HPLC and LC-MS methods.

The LC-MS showed three the ester products had 300, 420, and 540 molecular weights. The determination of antioxidant capacities with 1,1-difenil-2-pikril hidrazil (DPPH) showed that the ester products had $\text{IC}_{50} = 282$ ppm.