

Studi Katalisis Heterogen Menggunakan Penyangga Padatan Silika Sebagai Alternatif Katalisis Homogen Pada Nitration Eugenol = Study on Heterogeneous Catalysis Using Support Solid Silica as an Alternative Homogeneous Catalysis In Nitration of Eugenol

Fikri Sultoni, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20347682&lokasi=lokal>

Abstrak

Reaksi katalisis heterogen telah banyak diaplikasikan untuk menggantikan reaksi katalisis homogen dimana katalis yang digunakan umumnya sulit dipisahkan dengan produk hasil reaksi. Terlebih lagi pada beberapa katalis homogen bersifat tidak ramah lingkungan seperti reaksi nitration yang menggunakan katalis homogen asam sulfat pekat. Pada penelitian ini dilakukan modifikasi struktur eugenol hasil isolasi dari minyak cengkeh melalui reaksi nitration pada aromatik eugenol. Reaksi nitration dilakukan melalui katalisis homogen asam sulfat pekat dan katalisis heterogen dengan SiO₂ - H₂SO₄ sintesis sebagai katalis heterogen. Hasil produk nitro-eugenol tersebut dikarakterisasi menggunakan TLC-Scanner, LC-MS, dan GC. Hasil TLC mengindikasikan hasil reaksi selama 5 jam dengan katalis asam SiO₂ - H₂SO₄ terdapat eugenol yang belum terkonversi sehingga dilakukan variasi waktu reaksi: 6, 12, dan 18 jam reaksi. Hasil analisis MS pada katalisis heterogen 18 jam reaksi menunjukkan terdapat dua gugus nitro yang tersubstitusi pada aromatik eugenol sedangkan pada katalisis homogen tersubstitusi tiga gugus nitro. Berdasarkan analisis GC didapatkan %konversi nitro-eugenol hampir mencapai 100% pada 6, 12, dan 18 jam reaksi, dan %yield sebesar 78,394%; 87,371% dan 99,960% secara berurutan.

.....Heterogeneous catalysis reactions have been applied to replace homogeneous catalysis reactions in which the catalyst are generally difficult to separate from the reaction products. Moreover some of homogeneous catalysis reaction are environmentally unfriendly such as nitration reactions using concentrated sulfuric acid. In this study, the structure of isolated eugenol from clove oil was modified through the aromatic nitration reaction. The nitration reaction were performed over homogeneous catalysis and heterogeneous catalysis reaction using SiO₂ - H₂SO₄ as the heterogenous catalyst.

The reaction products nitro-eugenol were characterized using TLC-Scanner, LC-MS, and GC. The identifications by TLC indicated that the heterogenous nitration reactions of eugenol had not succeeded converted most of the eugenol in 5h reaction time, so that the reaction times were varied from 6h to 18h. The MS analysis showed that two nitro groups were bound to the aromatic ring of eugenol over heterogenous catalysis, whereas over the homogenous catalysis three nitro groups were bound to the aromatic ring of eugenol. Based on GC analysis, the %conversion of eugenol were almost 100% for 6h, 12h, and 18h of reaction times and the %products distribution were 78.39%, 87.37% and 99.96% successively.