Sintesis sinamaldehida berbasis reaksi kondensasi aldol silang antara benzaldehida dan asetaldehida menggunakan katalis heterogen = Synthesis of cinnamaldehyde based on cross aldol condensation reaction of benzaldehyde and acetaldehyde over heterogeneous catalysts

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Abstrak

Sinamaldehida merupakan salah satu produk bahan alam yang paling melimpah yang ditemukan pada kulit kayu spesies Cinnamomum dan terkenal karena aplikasinya dalam medis, pemberi cita rasa, industri parfum, dan sebuah intermediet berharga untuk banyak produk organik sintesis. Pada penelitian ini, sinamaldehida disintesis dengan reaksi katalitik homogen dan heterogen. Reaksi katalitik homogen dilakukan menggunakan larutan NaOH, sedangkan reaksi katalitik heterogen dilakukan menggunakan beberapa katalis padatan basa, yang mana katalis NaOH/Al2O3 yang dipreparasi dengan mencampur dan menggerus padatan NaOH dan Al2O3 (14 % berat Al2O3) telah sukses menampilkan reaksi kondensasi aldol silang dalam menghasilkan sinamaldehida. Katalis yang telah disiapkan dikonfirmasi dengan metode XRD. Reaksi kondensasi aldol antara benzaldehida dan asetaldehida dilakukan pada 70 oC dengan memvariasikan waktu reaksi. Produk reaksi dianalisis dengan GC dan GC-MS. Konsentrasi katalis = 3,5 % (% berat total reagen); rasio molar antara benzaldehida dan asetaldehida = 1,1:1; dan waktu reaksi 6 jam; distribusi produk sinamaldehida yang didapat 8,06 %.

.....Cinnamaldehyde is one of the most abundant natural product found in Cinnamomum sp. bark and is well known for its application in medicine, flavor, perfumery, and also a valuable intermediate compound for many synthesized organic products. In this research, cinnamaldehyde was synthesized by homogeneous and heterogeneous catalytic reactions. The homogeneous catalytic reaction was conducted using solution of NaOH, where as the heterogeneous catalytic reaction were conducted using some solid base catalysts, in which the catalyst NaOH/Al2O3 prepared by mixing and grinding solids of NaOH and Al2O3 (14 % of Al2O3 weight) has succeeded to perform the cross aldol condensation reaction of benzaldehyde and acetaldehyde in producing cinnamaldehyde. The catalyst prepared was confirmed by XRD method. The aldol condensation reaction of benzaldehyde and acetaldehyde were conducted at 70 oC by varying the reaction times. Reaction product was analyzed by GC and GC-MS. The catalyst concentration was 3,5 % (% weight of total reagents); molar ratio between benzaldehyde and acetaldehyde was 1,1:1; and time reaction was 6 hours; the distribution product cinnamaldehyde obtained was 8,06 %.