Sintesis Senyawa Amida Asam Risinoleat Tereduksi-Etanolamina sebagai Agen Antimikroba serta Uji Toksisitasnya Terhadap Daphnia magna = Synthesis of Amide Compound of Reduced Ricinoleic Acid-Ethanolamine as Antimicrobial Agent and Its Toxicity against Daphnia magna

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Abstrak

Asam risinoleat diketahui memiliki gugus unik yang dapat dimodifikasi menjadi senyawa lain. Transformasi asam risinoleat ini dapat memengaruhi bioaktivitasnya. Pada penelitian ini, asam risinoleat diubah menjadi senyawa amida (asam risinoleat tereduksi-etanolamina). Senyawa amida telah disintesis melalui reaksi esterifikasi, hidrogenasi, dan amidasi. Asam risinoleat diesterifikasi menggunakan katalis HCl dan metanol. Reaksi dilanjutkan dengan hidrogenasi menggunakan katalis Pd/C dan hidrogen (H2). Amidasi dilakukan terhadap metil risinoleat tereduksi menggunakan etanolamina. Senyawa amida dikarakterisasi menggunakan FTIR. Selanjutnya, Antimikroba telah dilakukan pada bakteri Gram positif Staphylococcus aureus dan Gram negatif Escherichia coli serta uji toksisitas terhadap Daphnia magna. Hasil FTIR menunjukkan adanya puncak serapan C=O amida, C-N, dan N-H yang menandakan senyawa amida telah terbentuk. Hasil aktivitas antimikroba tidak menunjukkan zona hambat pada kedua bakteri. Sebaliknya, hasil uji toksisitas menunjukkan hasil toksik sedang terhadap Daphnia magna dengan nilai LC50 sebesar 3,30 ppm.
.....Ricinoleic acid is known to have a unique structure and can be modified into other compounds. This transformation of ricinoleic acid can affect its bioactivity. In this research, the ricinoleic acid was converted into an amide compound (reduced ricinoleic acid- ethanolamine). The amide compound was synthesized through esterification, hydrogenation, and amidation. Ricinoleic acid was esterified using methanol and HCl catalyst. Hydrogenation of methyl ester was performed by hydrogen (H2) and Pd/C catalyst. Amidation was carried out on reduced methyl ricinoleate using ethanolamine. The FTIR was used to characterize amide compound. Next, the antimicrobial activity was tested on Gram-positive Staphylococcus aureus and Gram-negative Escherichia coli. The amide compound also tested for its toxicity against Daphnia magna. Characterization using FTIR showed the absorption peaks of C=O amide, C-N, and N-H indicated the formation of an amide compound. The results of antimicrobial activity did not show an inhibition zone in both bacteria. On the other hand, the toxicity test of amide compound has resulted moderately toxic against Daphnia magna with an LC50 value of 3.30 ppm.