Sintesis Lipoamida Risinoleat Terhidrasi-Etanolamina serta Uji Antimikroba dan Uji Toksisitasnya terhadap Daphnia Magna = Synthesis of Hydrated Ricinoleic Lipoamide – Ethanolamine and Test Antimicrobials and Their Toxicity Tests Against Daphnia Magna

Talitha Sadiya, author

Abstrak

Asam risinoleat merupakan asam lemak yang banyak terkandung di dalam minyak jarak. Asam risinoleat terdiri atas 18 karbon, memiliki ikatan rangkap di C9, gugus hidroksil di C12, dan gugus karboksil di terminal. Struktur yang unik dari asam risinoleat dapat dimodifikasi sehingga dapat dihasilkan berbagai macam senyawa derivat yang memiliki aktivitas antimikroba dan sifat toksik. Pada penelitian ini, dilakukan modifikasi asam risinoleat menggunakan etanolamina membentuk lipoamida melalui reaksi esterifikasi, hidrasi, dan amidasi. Reaksi esterifikasi asam risinoleat menjadi metil risinoleat menggunakan metanol dengan katalis HCl 1% (w/w). Reaksi hidrasi pada ikatan C=C metil risinoleat dilakukan dalam kondisi asam. Sementara reaksi amidasinya dengan etanolamina. Produk dari setiap tahapan reaksi diidentifikasi dengan KLT dan dikarakterisasi dengan FTIR. Hasil FTIR senyawa lipoamida risinoleat terhidrasi – etanolamina menunjukkan adanya pita serapan ulur N-H dan O-H yang overlapping pada bilangan gelombang 3633 – 3043 cm-1. Selain itu, terdapat puncak serapan C=O amida di 1651 cm-1 serta puncak serapan medium C-N dan N-H tekuk masing-masing pada bilangan gelombang 1551 cm-1 dan 1467 cm-1. Produk lipoamida yang diperoleh kemudian diuji aktivitas antimikrobanya menggunakan metode difusi cakram pada konsentrasi 500 ppm. Berdasarkan hasil pengujian, senyawa lipoamida risinoleat terhidrasi – etanolamina tidak menunjukkan aktivitas penghambatan pada bakteri Staphylococcus aureus dan bakteri Escherichia coli. Pada uji toksisitas dengan Daphnia magna selama 24 jam, senyawa lipoamida risinoleat terhidrasi – etanolamina memiliki nilai LC50 sebesar 32.23 ppm dan tergolong senyawa dengan toksisitas rendah.

.....Ricinoleic acid is a fatty acid found in castor oil. Ricinoleic acid consists of 18 carbons, has a double bond at C9, a hydroxyl group at C12, and a carboxyl group at the terminal. The unique structure of ricinoleic acid can be modified to produce various derivative compounds with antimicrobial activity and toxic properties. This study modified ricinoleic acid using ethanolamine to form lipoamides through esterification, hydration, and amidation reactions. Esterification reaction of ricinoleic acid into methyl ricinoleate using methanol with 1% (w/w) HCl catalyst. The hydration reaction on the C=C bond of methyl ricinoleate was affected under acidic conditions. While the amidation reaction with ethanolamine. The products of each reaction step were identified by TLC and characterized by FTIR. The FTIR results of hydrated ricinoleic lipoamide - ethanolamine showed the presence of overlapping N-H and O-H stretching absorption bands at a wave number of 3633 – 3043 cm-1. In addition, there is an absorption peak of C=O amide at 1651 cm-1 and an absorption peak of C-N and N-H bending medium at wave numbers of 1551 cm-1 and 1467 cm-1, respectively. The lipoamide product obtained was then tested for its antimicrobial activity using the disc diffusion method at a concentration of 500 ppm. Based on the test results, the hydrated ricinoleic lipoamide – ethanolamine did not show any inhibitory activity on Staphylococcus aureus and Escherichia coli bacteria. In the toxicity test with Daphnia magna for 24 hours, the hydrated lipoamide ricinoleate – ethanolamine has

an LC50 value of 32.23 ppm and is classified as a compound with low toxicity.