

# Esterifikasi gugus hidroksil asam risinoleat dan asam lemak minyak jarak teroksidasi dengan asam dekanat sebagai senyawa antimikroba dan emulsifier. = Esterification of oxidized hydroxyl groups of ricinoleic acid and castor oil fatty acids with decanoic acid as antimicrobial and emulsifier compounds

Utari Shintya Dewi, author

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## Abstrak

Penelitian ini, bertujuan melakukan sintesis ester asam lemak hasil hidrolisis minyak jarak teroksidasi dan ester asam risinoleat komersial teroksidasi. Asam lemak minyak jarak dan asam risinoleat komersial dioksidasi menggunakan  $\text{KMnO}_4$  untuk menghasilkan diol. Asam lemak teroksidasi kemudian diesterifikasi secara kimia menggunakan asam dekanat dengan variasi waktu reaksi (2,4,6, dan 8 jam) menggunakan katalis  $\text{ZnCl}_2$ . Produk-produk ester yang terbentuk diidentifikasi menggunakan FTIR. Hasilnya menunjukkan bahwa masing-masing produk ester memberikan pita serapan  $\text{C}=\text{O}$  ester pada rentang bilangan gelombang 1750. Masing-masing produk ester diuji kemampuannya sebagai emulsifier, hasilnya menunjukkan bahwa semua produk ester mampu mempertahankan bentuk teremulsi kurang lebih 24 jam dengan tipe emulsi air dalam minyak. Uji aktivitas antimikroba dari semua produk ester memberikan hasil positif berupa adanya zona hambat pada hasil ester asam lemak hasil hidrolisis teroksidasi dan ester asam risinoleat komersial teroksidasi terhadap pertumbuhan *Propionibacterium acnes* dan *Staphylococcus epidermidis*. Zona hambat terbesar untuk bakteri *Propionibacterium acnes* dan *Staphylococcus epidermidis* masing-masing sebesar 20 mm yang dihasilkan oleh ester asam lemak hasil hidrolisis minyak jarak teroksidasi dengan asam dekanat 8 jam.

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The aim of this study was to synthesis fatty acid ester compound from oxydized fatty acid obtained from hydrolyzed castor oil and oxidized commercial ricinoleic acid. Castor oil fatty acid and commercial ricinoleic acid were oxidized using  $\text{KMnO}_4$  to produce diols. The oxidized fatty acids were then esterified chemically using decanoic acid with various reaction time (2,4,6, and 8 hours) using  $\text{ZnCl}_2$  as catalyst. All of ester products were identified using FTIR. The results showed that each ester product gave absorption band  $\text{C}=\text{O}$  ester group at the range of wave number 1750 1720  $\text{cm}^{-1}$ . Each ester products were tested as an emulsifier. The results showed that all ester products were able to maintain an emulsion up to approximately 24 hours with water-in-oil emulsion (w/o) type of emulsion. The antimicrobial activity test of all ester products gave positive results in the presence of inhibition zone to the growth of *Propionibacterium acnes* and *Staphylococcus epidermidis*. The largest inhibitory zone againts *Propionibacterium acnes* and *Staphylococcus epidermidis* were 20 mm which was produced by fatty acid ester compound of oxidized castor oil fatty acid obtained from 8 hours reaction time.