Studi sintesis enzimatis ester glikol - asam lemak hasil hidrolisis minyak jarak dan asam palmitat menggunakan lipase candida rugosa ec 3.1.1.3 sebagai senyawa emulsifier dan antimikroba = Study of enzymatic synthesis of glycol - castor oil fatty acid and glycol - palmitic acid esters as emulsifier and antimicrobial compounds using candida rugosa lipase ec 3.1.1.3

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Abstrak

Pada penelitian ini, telah dilakukan sintesis enzimatis ester glikol asam lemak hasil hidrolisis minyak jarak dan ester glikol palmitat dengan bantuan lipase Candida rugosa. Esterifikasi dilakukan dengan perbandingan variasi asam lemak dengan alkohol yaitu 1:1, 1:2, 1:3, dan 1:4. Selanjutnya dilakukan identifikasi produk esterifikasi menggunakan FTIR. Spektrum ester glikol asam lemak hasil hidrolisis minyak jarak menunjukkan adanya serapan gugus fungsi C=O ester, C-O-C, dan OH masing-masing pada bilangan gelombang 1732,27 cm-1; 1242,73 cm-1, dan 3412,04 cm-1. Produk ester glikol palmitat juga menunjukkan adanya serapan gugus fungsi C=O dan C-O-C masing-masing pada bilangan gelombang 1741,88 cm-1 dan 1179,54 cm-1.
Uji persen konversi dilakukan untuk menentukan banyaknya asam lemak yang telah terkonversi menjadi ester. Nilai konversi tertinggi untuk sintesis ester glikol asam lemak hasil hidrolisis minyak jarak diperoleh pada perbandingan ratio 1:4, yaitu 84,7, sedangkan untuk ester glikol palmitat sebesar 81,9.
Hasil uji emulsifier menunjukkan bahwa ester glikol asam lemak hasil hidrolisis minyak jarak memiliki sifat sebagai emulsifier, begitu pula terhadap ester glikol palmitat. Uji antimikroba juga telah dilakukan terhadap ester glikol asam lemak hasil hidrolisis minyak jarak dan ester glikol palmitat. Hasil uji antimikroba menunjukkan bahwa ester glikol asam lemak hasil hidrolisis minyak jarak memiliki aktivitas sebagai antimikroba terhadap bakteri Propionibacterium acnes dan Staphylococcus epidermidis dengan diameter zona hambat sebesar 12 dan 10 mm. Namun, ester glikol palmitat belum memiliki aktivitas sebagai antimikroba.
<hr><i>The purpose of this study was to synthesize glycol ndash castor oil fatty acid and glycol ndash palmitic acid esters using Candida rugosa lipase as biocatalyst. The ester products was expected to have emulsifier and antimicrobial properties. Esterification was conducted by reacting fatty acid and glycol at 37 C for 18 hours. The variation of mmol ratio fatty acid to glycol used were 1 1, 1 2, 1 3, and 1 4. The ester product was characterized using FTIR and the conversion percentage was determined by titrimetric method. Emulsifier test also performed to determine the ability of ester product as emulsifier. Antimicrobial assay were also conducted using disc diffusion method against Propionibacterium acne and Staphylococcus epidermidis. FTIR spectra for glycol ndash castor oil fatty acid and glycol ndash palmitic esters showed the absorption of C O functional groups at wave numbers 1732.27 and 1741.88 cm 1, respectively. The highest conversion percentage value for glycol ndash castor oil fatty acid and glycol ndash palmitic ester were 84.7 and 81.9, respectively.
The emulsifier test showed that both glycol ndash fatty acid ester have properties as emulsifiers. Antimicrobial assay showed that glycol ndash castor oil fatty acid ester have activity as antimicrobial

against Propionibacterium acne and Staphylococcus epidermidis. However, glycol palmitic ester has no activity as an antimicrobial agent. The glycol ndash castor oil fatty acid and glycol-palmitic esters were successfully synthesized enzymatically using Candida rugosa lipase. Both ester products have properties as emulsifiers, but only glycol castor oil fatty acid ester has potential to be an antimicrobial compound.