

Sintesis Dan Karakterisasi Asam 2-Heksadekanoiloksipropana-1,2,3-Trikarboksilat Dengan Kromatografi Gas cair = Synthesis And Characterization Of 2-Hexadecanoyloxypropana-1,2,3-Tricarboxylic Acid By Gas-Liquid Chromatography

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Abstrak

Senyawa ester asam lemak merupakan bahan kimia yang banyak dikembangkan saat ini, diantaranya digunakan pada produk-produk kosmetika dan pangan. Di Indonesia banyak penghasil asam sitrat dan asam palmitat yang memungkinkan untuk pembuatan senyawa ester asam palmitat dan asam sitrat lainnya. Oleh karena itu, percobaan sintesis ester asam 2-heksadekanoiloksipropana-1,2,3-trikarboksilat melalui proses esterifikasi asam sitrat dan asam palmitat, yang diprediksi memiliki potensi sebagai emulgator perlu dilakukan. Asam 2-heksadekanoiloksipropana-1,2,3-trikarboksilat disintesis melalui tiga tahap reaksi. Tahap pertama mereaksikan asam sitrat dengan anhidrida asetat dalam suasana asam menghasilkan asetilsitrat. Tahap kedua mereaksikan asam palmitat dalam benzen dengan metanol menggunakan katalis asam sulfat pekat menghasilkan metil palmitat. Tahap ketiga interesterifikasi antara asetilsitrat dan metil palmitat dengan katalis natrium metoksida menghasilkan asam 2-heksadekanoiloksipropana-1,2,3-trikarboksilat dengan rendemen 72,07%.

Metode analisis senyawa ester menggunakan kromatografi gas kolom VB-wax (60 m x 0,32 mm), suhu kolom terprogram 170-190°C, kenaikan 2°C /menit, dan dipertahankan selama 30 menit. Pada kondisi analisis diperoleh waktu retensi asam 2-heksadekanoiloksipropana-1,2,3-trikarboksilat 39,894 menit dengan kadar 72,07%. Karakterisasi dari asam 2-heksadekanoiloksipropana-1,2,3-trikarboksilat memiliki bilangan asam sebesar 395,38 dan nilai HLB 7,625.

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Fatty acid esters compound were chemical substance that were more developed now, that were used at food and cosmetic products. In Indonesia, many of citric acid and palmitic acid producer that possible to make another citric acid and palmitic acid esters compound. For that reason, experiment to synthesize ester of 2-hexadecanoyloxypropana-1,2,3-tricarboxylic acid was might be synthesis by esterification of palmitic acid with citric acid, that was predicted has potency as emulsifier become necessary. 2-

Hexadecanoyloxypropana-1,2,3-tricarboxylic acid compound was synthesized over three steps of reaction. First step was reacted citric acid with acetic anhydride in acidic environment yielded acetylcitrate. Second step was reacted palmitic acid in benzene with methanol catalyzed by sulfuric acid yielded methyl palmitate. Third step was interesterification of acetylcitrate with methyl palmitate catalyzed by sodium methoxide yielded 2-hexadecanoyloxypropana-1,2,3-tricarboxylic acid with rendement over 72.07%.

Method of analysis ester components was performed using gas chromatography with VB-Wax column (60 m x 0.32 mm), column temperature was programmed at 170°C-190°C, increased by 2°C/minute, and held for 30 minutes. In analysis conditions was yielded retention time of 2-hexadecanoyloxypropana-1,2,3-tricarboxylic acid 39.894 minutes with levels 72.07%. Characterization of 2-hexadecanoyloxypropana-1,2,3-tricarboxylic acid has acid value 395.38 and Hydrophilic Lipophylic Balance (HLB) value 7.625.