

DESIGN OF SUCROSE ESTER PURIFICATION PROCESS

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ABSTRACT

AGIS TRIONO. Design of Purification Sucrose Esters Process. Supervised by ERLIZA HAMBALI and RINI PURNAWATI.

Indonesia is a world palm oil producer, with an area of palm oil plantations reaching 15.3 million hectares in 2023. One of the uses of its derivative products is sucrose ester surfactants. Sucrose ester is obtained by the transesterification reaction of palm fatty acids and sucrose with a base catalyst. This study aimed to determine the optimal sucrose ester purification process using liquid-liquid extraction. The method used is liquid-liquid extraction using different KCl and NaCl salt solutions. The extraction purification results were only around 50% yield. The analysis showed that sucrose ester's pH decreased from 12 to 5. The emulsion stability, foam stability, and yield parameters decreased after purification. Meanwhile, the parameters of droplet size, surface tension, and interfacial tension increased. The results of the FTIR analysis showed that sucrose ester was by commercial products but only contained monoesters. Based on testing, the purification process was performed under the best conditions using KCl salt.

Keywords: liquid-liquid extraction, purification, sucrose ester

ABSTRAK

AGIS TRIONO. Desain Proses Purifikasi Sukrosa Ester. Dibimbing oleh ERLIZA HAMBALI dan RINI PURNAWATI.

Indonesia merupakan penghasil minyak kelapa sawit di dunia dengan luas perkebunan kelapa sawit mencapai 15,3 juta hektar pada tahun 2023. Salah satu pemanfaatan produk turunannya adalah surfaktan sukrosa ester. Sukrosa ester diperoleh dengan reaksi transesterifikasi asam lemak sawit dan sukrosa dengan katalis basa. Tujuan penelitian ini adalah untuk mengetahui proses pemurnian sukrosa ester yang optimal menggunakan metode ekstraksi cair-cair. Metode yang digunakan merupakan ekstraksi cair-cair dengan menggunakan perbedaan jenis larutan garam KCl dan NaCl. Hasil ekstraksi pemurnian hanya didapatkan sekitar 50% rendemen. Hasil analisis menunjukkan bahwa nilai pH sukrosa ester mengalami penurunan dari 12 menjadi 5. Parameter stabilitas emulsi, stabilitas busa, dan rendemen mengalami penurunan setelah proses purifikasi berlangsung. Sedangkan, untuk parameter ukuran droplet, tegangan permukaan, dan tegangan antarmuka mengalami peningkatan. Hasil analisis FTIR menunjukkan bahwa sukrosa ester telah sesuai dengan produk komersial, namun hanya mengandung monoester. Berdasarkan pengujian, proses pemurnian dengan kondisi terbaik adalah dengan menggunakan garam KCl.

Kata kunci: ekstraksi cair-cair, pemurnian, sukrosa ester



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DESIGN OF SUCROSE ESTER PURIFICATION PROCESS

AGIS TRIONO

Undergraduate Final Project
One of the requirements for obtaining a Bachelor of
Engineering Degree with Honours
at
Study Program of Agro-Industrial Engineering

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PREFACE

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Bogor, August 2024

Agis Triono



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