PROCESS SIMULATION OF CORN OIL DEODORIZATION FOR REMOVING FREE FATTY ACIDS

A PROJECT REPORT

Submitted by

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In partial fulfillment for the award of the Degree of

Bachelor of Technology

In

Chemical Engineering

Under the guidance of

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CERTIFICATE

This is to certify that the project entitled:

PROCESS SIMULATION OF CORN OIL DEODORIZATION FOR REMOVING FREE FATTY ACIDS *submitted by* ***LOVINA RANJAN*** *to the Guru Ghasidas Vishwavidyalaya towards partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Chemical Engineering is a bona fide record of the work carried out by her under my/our supervision and guidance.*

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ABSTRACT

This project presents a comprehensive simulation and optimization study of the deodorization process for corn oil using DWSIM software. The simulation workflow involved the design and analysis of multiple distillation columns to refine parameters, optimize separation efficiency, and achieve desired product specifications. Initially, shortcut distillation columns were employed to calculate critical parameters such as reflux ratio, number of stages, and molar flow rates. Subsequently, these values were integrated into rigorous distillation column models to simulate the actual separation process. Each distillation column targeted specific components, including free fatty acids (FFAs) such as oleic acid, linoleic acid, and stearic acid, based on their boiling points and physical properties.

The simulation results demonstrated the effectiveness of the distillation process in selectively extracting and purifying FFAs from corn oil. For instance, in the first distillation column, approximately 90% mole fraction of oleic acid was obtained in the bottom product, while 80% mole fraction of linoleic acid was obtained in the top product. Subsequent columns further refined these components, with the third column achieving approximately 98% mole fraction of oleic acid to meet desired purity levels.

Graphical analysis depicting stage versus molar fraction and stage versus interstage flow provided valuable insights into component behaviour and separation dynamics within the distillation columns. These visual representations aided in optimising distillation parameters, refining product quality, and understanding mass transfer phenomena during the deodorization process. This project underscores the significance of simulation tools like DWSIM in refining edible oil processing techniques.