

Simulation of Palm based Fatty Acids Distillation

Abstract

Fatty acids have long been recognized for their commercial value in the absence of glycerol. Chemicals derived from fatty acids are widely used in the formulation of detergents, lubricant, surfactants and in pharmaceutical industries. In addition, fatty acids also play a vital role in human metabolism and are widely used as catalyst in some chemical reactions. Commercially produced fatty acids are derived from naturally occurring fats and oils through the process of hydrolysis. Most of these raw materials result in nature as complex mixtures of triglycerides, alcohols and other esters. Alternatively, common edible oils used are sunflower oil, com oil, soybean oil, palm and palm kernel oil. Crude fatty acids can be obtained from the process of hydrolysis and will be purified through total distillation. Due to fatty acid market demand, the purity requirement of distilled fatty acid products is increasing greatly. Since desired purity of fatty acid is achievable through the most common and most efficient means of fractionation distillation process, study on simulation of fatty acids distillation has a significant contribution to the oleo chemical industry. In this simulation study, the optimization of the tray specification, feed stream pressure and temperature on the purity performance of the fatty acid composition are investigated. In South East Asia, palm tree fruit ripen continuously and can be harvested all year round. Therefore, palm based fatty acids are selected to be used as the feed components. In the present study, binary and multi-component distillations of saturated and unsaturated fatty acids are studied. This simulation model is developed by using HYSYS simulator with suitable thermodynamic package chosen. A shortcut simulation method is built in advanced for preliminary estimations and for determining rigorous operating limits. Eventually, parametric optimization is performed to obtain the optimum operating conditions of the rigorous distillation column. 2010 Asian Network for Scientific Information.