Process Simulation of Steam Stripping of Bleached Palm Oil Deodorization for Removing Free Fatty Acids using DWSIM

CHALLA DEEPAK

Sri Venkateswara University College Of Engineering, Tirupati

Background & Description:

The presence of free fatty acids (FFAs) and odoriferous components in the bleached palm oil (BPO) need to be removed to meet the specific standard quality and make the oil palatable. Because FFAs and odoriferous components is more volatile than the main oil components, they vaporize readily thus being removed from the oil product. Deodorization is the key process in industry to remove FFAs by vaporizing them using steam stripping agent such as steam under vacuum. In this work, a simulation study was adopted for the analysis of deodorization process implemented in an open-source chemical process simulator software, DWSIM. The deodorization section was modelled using absorber column unit operation in the software. The process conditions and BPO compositions fed into the deodorizer were taken from literature. The simulation showed much decrease in the FFAs content below the maximum value as standardized by the authorized association. The deodorization of BPO was analyzed by studying the column profiles such as the individual TGs, FFAs and water interstage flows in vapour and liquid phases, and the total component interstage flow for vapour and liquid phases' profiles. From the simulation study under defined process conditions, the percentage removal of FFAs from the BPO was >99.99%.

FLOWSHEET ALONG WITH MASTERPROPERTY TABLE:-
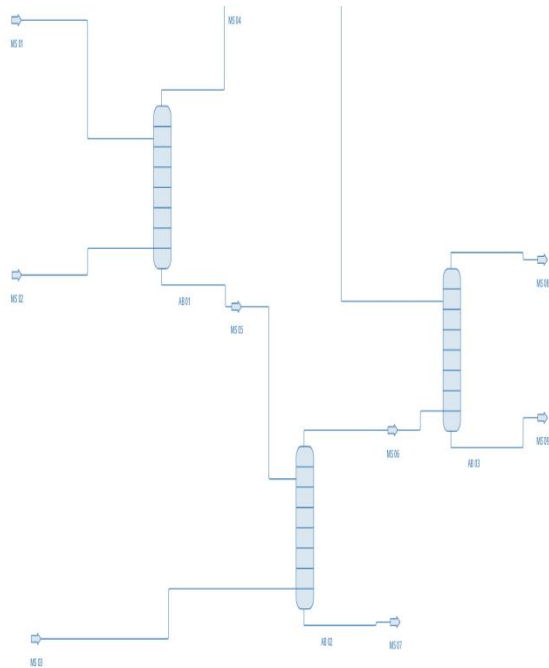
Master Property Table				
Object	MS 09	MS 08	MS 07	
Temperature	112.145	150.49	110.598	C
Pressure	1.01325	1.01325	1.01325	bar
Mass Flow	145.524	213.916	548.98	kg/h
Molar Fraction (Mixture) / TriPalmitin (PPP)	5.25092E-148	6.94387E-07	0.469675	
Mass Fraction (Mixture) / TriPalmitin (PPP)	2.35313E-146	3.11132E-05	0.482787	
Molar Fraction (Mixture) / TriOlein (OOO)	5.23841E-173	2.33644E-07	0.448086	
Mass Fraction (Mixture) / TriOlein (OOO)	2.57466E-171	1.14818E-05	0.505161	