

Use of Soluble Silicates in Vegetable Oil Refining to Remove Acidity and Soapstock by Filtration and Refining.

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Use of sodium silicate in refining of several vegetable oils is reported as method to replace conventional processing with caustic refining. The method used to remove the soapstock generated was filtration and decanting. Additional work was conducted to approach complete neutralization of free fatty acids. The basic process consisted to first heat the oil to a predetermined temperature and then add different levels (plus an excess) of sodium silicate solution under constant stirring and heat for a particular time. Three different temperatures 180°F, 200°F, 210°F, and 3 levels of %excess 0.2%, 0.5%, and 2 % of sodium silicate and three mixing time 10 min, 20 min, and 30 min were used in this experiment. A 33 factorial fixed effect statistical model was used to see the effect of different levels of all three factors and all possible combinations (Interactions) of different levels in approaching complete neutralization of vegetable oil.

Results showed sodium silicate was effective in neutralizing free fatty acids comparably or better to sodium hydroxide. Refining of the oils with sodium silicate showed that the soapstock can be effectively removed by filtration or decanting. Refining with sodium silicate involved similar preparation steps as with sodium hydroxide. The concentration of silicate was varied between 10-50% in aqueous solutions. The silicate tended to agglomerate into a more solid soapstock at higher concentrations. The final refined oil with less than 0.02 % final free fatty acids can be obtained with minimal oil loss. The major impact of switching refining agents from caustic to silicates is increase in oil yield, elimination of centrifuging and water washing of the oil.