FREE FATTY ACIDS

PRINCIPLE

The free fatty acids in corn oil are measured by extracting the sample with hot ethyl alcohol and titrating the supernatant alcohol layer with standard alkali. For corn oil, the free fatty acids are normally calculated as oleic acid.

SCOPE

This method is applicable to corn oil, both crude and refined.

REAGENTS

1. Ethyl alcohol, 95% (TTB Formulae 30 and 3A are permitted) (Note 1)

2. Phenolphthalein indicator, 1%

3. Sodium hydroxide solution, 0.1 *N*: Standard

PROCEDURE

Weigh accurately about 50.0 g of well mixed sample into a 300 mL Erlenmeyer flask (Note 2). Add 75 mL of hot, neutralized ethyl alcohol. Heat the mixture to near boiling and titrate while hot with 0.1 *N* sodium hydroxide solution to the first permanent pink color. The pink color should be observed in the alcohol layer above the sample after the latter has been allowed to settle for a few seconds (Note 3).

CALCULATION

$$\textit{Free Fatty Acids as Oleic Acid, \%} = \frac{\textit{mL } 0.1\,\text{N } \textit{NaOH} \times 0.0282 \times 10}{\textit{Sample Wt., g}}$$

FREE FATTY ACIDS — continued

NOTES AND PRECAUTIONS

1. The ethyl alcohol, 95%, must give a sharp end point with phenolphthalein. Neutralize the alcohol immediately before using. Heat 75 mL of alcohol containing 2 mL of phenolphthalein indicator to incipient boiling and add dropwise 0.1 *N* sodium hydroxide solution until a faint pink color persists.

2. Since crude oils have a higher free fatty acid content, a 10 g sample is adequate.

3. The pink color should be of the same intensity as that of the neutralized alcohol before it is added to the sample and should persist for at least 30 seconds.