Quality Control Specifications And Tests For Fats

A) Free Fatty Acid (FFA):

The reaction between an alkali and fat or fatty acids is the basis of two important analytical determinations.

Firstly, acid value is defined as the number of milligrams of potassium hydroxide required to neutralise the free fatty acids in one gram of fat.

Acid value is a measurement that avoids the use of assumed molecular weights as occurs in the following determination.

The acidity of fats is also often expressed directly in terms of percent Free Fatty Acids (FFA).

The assumption usually made in the calculation is that the acids have a molecular weight equal to that of an oleic acid. The relation between acid value and percent free fatty acids calculated as oleic is as follows: 1 unit of acid value = 0.503% free fatty acids

i) Free fatty acids as oleic, % =

$$\frac{\text{ml of alkali} \times N \times 282}{10 \times \text{weight of sample}}$$

ii) Free fatty acids as lauric, % =

$$\frac{\text{ml of alkali} \times N \times 200}{10 \times \text{weight of sample}}$$

iii) Free fatty acids as palmitic, % =

$$\frac{\text{ml of alkali} \times N \times 256}{10 \times \text{weight of sample}}$$

Note: N = normality or strength of alkali
282, 200, 256, = molecular weights of respective fatty acids

In many types of fats and oils the percentage of free fatty acids is calculated as oleic acid, but with coconut and palm kernal oils it is expressed in terms of lauric acid and in palm oil as palmitic acid.

The definition of FFA for feed grade fats is the same. The FFA of feed-grade fats during summer can be higher due to higher temperatures causing fat hydrolysis in the tissues prior to processing.