

Experiment No. 3

Aim of the experiment: To determine acid value of given oil sample

Apparatus required: 250 ml round bottomed flasks, beakers, reflux condenser, Buchner flasks, Buchner funnel, thermometer, separatory funnel, etc.

Chemicals required: Oil sample, Potassium hydroxide, ether, ethanol, phenolphthalein.

Principle: The acid value is the number which expresses in milligrams the amount of potassium hydroxide necessary to neutralize the free acids present in 1gm of substance.

Acid value = $5.61n/w$

where, n= the no. of ml of 0.1 M KOH required

W= the weight in gram of substance

It is also known as neutralization number or acid number.

Rancidity may occur in oil upon storage especially when oil contains high content of fatty acid or fatty oils. The decomposed compounds such as free fatty acids, peroxides, low molecular weight aldehyde and low molecular weight ketones are produced.

Acid value is calculated as

Acid value of oil = (volume of KOH used (mL) x normality of KOH)/weight of oil taken

Procedure: Unless otherwise specified in the individual monograph, dissolve about 10gm of the substance under examination, accurately weighed, in 50ml mixture of equal volume of ethanol (95%) and ether previously neutralized with 0.1 M KOH to phenolphthalein solution. if the sample does not dissolve in the cold solvent, connect the flask with reflux condenser and warm slowly with frequent shaking, until the samples dissolves. Add 1ml of phenolphthalein solution and titrates with 0.1M KOH until the solution remains faintly pink after shaking for 30 seconds. Calculate the acid value from the expression given above.

Or

The accurately weighted quantity of oil is taken in a conical flask and 50 ml neutral alcohol is added, the mixture is heated over bath using water condenser for 1 hour. The contents are cooled titrated with KOH solution using phenolphthalein indicator.

Significance of the acid value

- The acidity of oil is due to hydrolysis or oxidation of oil by atmospheric moisture leading to the formation of fatty acids.
- Lubricants oil with acid values greater than 0.1 corrode metals, form gum and sludge during operation.