OIV-MA-AS322-05A Iron

Type IV method

1. Principle

After suitable dilution of the wine and removal of alcohol, iron is determined directly by atomic absorption spectrophotometry.

2. Method

1. Apparatus

    1. Rotary evaporator with thermostatically controlled water bath.
    2. Atomic absorption spectrophotometer equipped with an air-acetylene burner.
    3. Iron hollow cathode lamp.

2.2. Reagents

2.2.1. Concentrated standard iron solution containing 1 g Fe (III) per liter.

Use a standard commercial solution, 1 g/L. This solution may be prepared by dissolving 8.6341 g of ferric ammonium sulfate, $FeNH_4(SO_4)_2.12H_20$, in distilled water slightly acidified with hydrochloric acid, 1 M, and making up to one liter.

2.2.2. Dilute standard iron solution containing 100 mg iron per liter.

2.3. Procedure

2.3.1. Preparation of sample

Remove the alcohol from the wine by reducing the volume of the sample to half its original size using a rotary evaporator (50 to 60 □C). Make up to the original volume with distilled water.

If necessary, dilute prior to analysis with distilled water.

2.3.2. Calibration

Place 1, 2, 3, 4 and 5 mL of the solution containing 100 mg iron per liter (2.2.2) respectively into each of five 100 mL volumetric flasks and make up to 100 mL with distilled water. The solutions prepared in this way contain 1, 2, 3, 4 and 5 mg of iron per liter respectively. These solutions should be stored in polyethylene bottles.

2.3.3. Determination

Set the absorption wavelength to 248.3 nm. Zero the absorbance scale using distilled

water. Aspirate the diluted sample directly into the spectrophotometer, followed in succession by the five standards (2.3.2). Record the absorbance. Repeat each measurement.

2.4. Expression of results

2.4.1. Method of calculation

Plot a graph giving the variation in absorbance as a function of the iron concentration in the standard solutions. Record the mean value of the absorbance obtained with the diluted wine sample on this graph and read its iron concentration C.

The iron concentration in milligrams per liter of the wine to one decimal place is given by:

$$F \times C$$

where F is the dilution factor.