OIV-MA-AS322-03A Sodium

Type II method

1. Principle

Sodium is determined directly in the wine by atomic absorption spectrophotometry after the addition of cesium chloride to suppress ionization of sodium.

2. Method

2.1. Apparatus

Atomic absorption spectrophotometer equipped with an air□acetylene burner.

Sodium hollow cathode lamp.

2.2. *Reagents*

2.2.1. Solution containing 1 g of sodium per liter:

The use of a commercial standard solution containing 1 g of sodium per liter is preferred.

Alternatively, this solution may be prepared by dissolving 2.542 g of anhydrous sodium chloride (NaCl) in distilled water and making up to a volume of 1 liter.

Keep this solution in a polyethylene bottle.

2.2.2. Matrix (model) solution:

Citric acid monohydrate, ($C_6H_8O_7.H_2O$) 3.5 g

Sucrose 1.5 g

Glycerol 5.0 g

Anhydrous calcium chloride (CaCl_2). 50 mg

Anhydrous magnesium chloride, (MgCl_2) 50 mg

Absolute alcohol 50 mL

De□ionized water to 500 mL

2.2.3. Cesium chloride solution containing 5% cesium

Dissolve 6.330 g of cesium chloride, CsCl, in 100 mL of distilled water.

2.3. *Procedure*

2.3.1. Preparation of the sample

Pipette 2.5 mL of wine into a 50 mL volumetric flask, add 1 mL of the cesium chloride solution (2.2.3) and make up to the mark with distilled water.

2.3.2. Calibration

Place 5.0 mL of the matrix solution in each one of five 100 mL volumetric flasks and

add 0, 2.5, 5.0, 7.5 and 10 mL respectively of a 1:100 dilution of the 1 g/L sodium solution. Add 2 mL of the cesium chloride solution (2.2.3) to each flask and make up to 100 mL with distilled water.

The standard solutions prepared in this way contain 0.25, 0.50, 0.75 and 1.00 mg of sodium per liter respectively and each contains 1 g of cesium per liter. Keep these solutions in polyethylene bottles.

2.3.3. Determination

Set the absorbance wavelength to 589.0 nm. Zero the absorbance scale using the zero standard solution. Aspirate the diluted wine (2.3.1) directly into the spectrophotometer, followed in succession by the standard solutions (2.3.2). Record each absorbance and repeat each measurement.

2.4. *Expression of results*

2.4.1. Method of calculation

Plot a graph of measured absorbance versus the sodium concentration in the standard solutions.

Record the absorbance obtained with the diluted wine on this graph and determine its sodium concentration C in milligrams per liter.

The sodium concentration in milligrams per liter of the wine will then be F x C, expressed to the nearest whole number, where F is the dilution factor.

2.4.2. Repeatability *(r):*

- $r = 1 + 0.024\ xi$ mg/L.

x_i= concentration of sodium in the sample in mg/L.

2.4.3. Reproducibility (R):

- $R = 2.5 + 0.05\ xi$ mg/L.

x_i= concentration of sodium in the sample in mg/L.