OIV-MA-AS322-02A Potassium

Type II method

1. Principle

Potassium is determined directly in diluted wine by atomic absorption spectrophotometry after the addition of cesium chloride to suppress ionization of potassium.

2. Method

2.1. *Apparatus*

Atomic absorption spectrophotometer, equipped with an air - acetylene burner

Potassium hollow cathode lamp

2.2. Reagents

2.2.1. Solution containing 1 g of potassium per liter.

Use a standard commercial solution containing 1 g of potassium per liter. This solution may be prepared by dissolving 4.813 g of potassium hydrogen tartrate ($C_4H_5KO_6$) in distilled water making up the volume to 1 liter with water.

2.2.2. Matrix (model) solution:

- citric acid monohydrate :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
- water to 500 mL

3. Cesium chloride solution containing 5% cesium:

Dissolve 6.33 g of cesium chloride, CsCl, in 100 mL of distilled water.

2.3. *Procedure*

2.3.1. Preparation of sample

Pipette 2.5 mL of wine (previously diluted 1/10) into a 50 mL volumetric flask, add 1 mL

of the cesium chloride solution and make up to the mark with distilled water.

2.3.2. Calibration

Introduce 5.0 mL of the matrix solution into each one of five of 100mL volumetric flasks and add 0, 2.0, 4.0, 6.0 and 8.0 mL respectively of the 1 g/L potassium solution (previously diluted 1/10). Add 2 mL of the cesium chloride solution to each flask and make up to 100 mL with distilled water.

The standard solutions contain 0, 2, 4, 6 and 8 mg of potassium per liter respectively and each contains 1 g of cesium per liter. Keep these solutions in polyethylene bottles.

2.3.3. Determination

Set the wavelength to 769.9 nm. Zero the absorbance scale using the zero standard solution (2.3.2). Aspirate the diluted wine (2.3.1) directly into the spectrophotometer, followed in succession by the standard solutions (2.3.2). Record the absorbance for each solution and repeat.

2.4. *Expression of results*

2.4.1. Method of calculation

Plot a graph showing the variation in absorbance as a function of potassium concentration in the standard solutions.

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

The potassium concentration, expressed in milligrams per liter of the wine to the nearest whole number, is F x C, where F is the dilution factor (here 200).

2.4.2. Repeatability *(r):*

- r = 35 mg/L.

3. Reproducibility (R):

- R = 66 mg/L.

4. Other ways of expressing results

In milliequivalents per liter:

- 0.0256 x F x C.

In mg potassium hydrogen tartrate per liter:

- 4.813 x F x C.