COEI-2-POTASS Determination of potassium by atomic absorption spectrometry

1. Principle

The potassium is determined by mineralisation by dry process by atomic absorption spectrometry.

The addition of a spectral buffer (cesium chloride) to avoid the ionisation of the potassium is necessary.

2. Apparatus

2.1. Glassware

- 100 and 200 ml graduated flasks (class A)
- 1, 2, 4 and 10 ml graduated pipettes (class A)
- 100 ml cylindrical vase

2. Instrumental parameters (given as an example)

- atomic absorption spectrophotometer
- oxidant air-acetylene flame (flow rate-air: 3 l/min, flow rate-acetylene: 1.8 l/min.)
- Hollow-cathode lamp (potassium)
- wave length: 769.9 nm
- width of the slit: 0.5 nm
- intensity of the lamp: 7 mA
- no correction of non specific absorption.

3. Reagents

3.1. Pure demineralised water for analysis

3.2. Cesium chloride (CsCl)

3.3. Cesium chloride solution at 5% in cesium: Dissolve 6.330 g of cesium chloride in 100 ml of demineralised water.

3.4. Potassium reference solution at 1 g/l commercial or prepared as follows:

dissolve 2.5856 g KNO_3 in water, adjust to 1 l.

3.5. Diluted potassium solution at 100 mg/l: Place 10 ml of the potassium reference solution at 1 g/l in a 100 ml graduated flask and 1 ml of pure nitric acid; complete to volume with pure demineralised water for analysis.

3.6. Set of calibration solution at 0, 2, 4, 6 and 8 mg of potassium per litre:

In a series of 100 ml graduated flasks, introduce 0; 2.0; 4.0; 6.0; 8.0 ml of the potassium solution at 100 mg/l ; add 2 ml of the cesium chloride solution to all the graduated flasks; adjust the volume to 100 ml with pure demineralised water for analysis.

The calibration solutions prepared contain 1 g of cesium per litre.

4. Preparation of samples

4.1. Liquid or solution oenological products

In a 50 ml graduated flask, place 1 ml of the cesium chloride solution at 5% and a volume of a sample as is after having completed to volume with demineralised water; the concentration of potassium to be measured is below 8 mg/l.

4.2. Solid oenological products

Proceed with mineralisation by dry process (take cinders in 2 ml of hydrochloric acid in a 100 ml flask, add 2 ml of cesium chloride at 5% and complete to volume with demineralised water).

Perform a blank test with demineralised water.

5. Determinations

Present successively the calibration solutions.

Perform an absorbance reading for 10 seconds; perform two measurements.

Set up the calibration curve (absorbance depending on the concentration in mg/l of potassium).

Then present the samples, perform an absorbance reading for 10 seconds; perform two measurements.

Calculate the concentration of potassium in the oenological products in mg/kg.