OIV-MA-BS-30 Copper- Determination by atomic absorption

Type IV method

1. Principle

Copper content is determined by atomic absorption spectrophotometry by means of an oxidizing acetylene air flame using a copper hollow-cathode lamp, at wavelength 324.7 nm, on the dealcoholised alcoholic beverage, according the so-called "standard addition" method.

2. Apparatus

2.1. Glassware.

2.1.1. 50 ml, 200 ml volumetric flasks (class A).

2.1.2. 5 ml, 10 ml, 50 ml volumetric pipettes (class A).

2.1.3. 20 ml tablet bottles

2.1.4. 200 µl automatic micropipette.

2.1.5. 250 ml beaker (Class A)

2.2. Spectrophotometer (sample setting for Varian 575 model

2.2.1. Oxidising air-acetylene flame

- Flow rates air: 7.5 1/min
- C2 H2: 1.8 l/min

2. Copper hollow-cathode lamp; Wavelength:

- 324.7 nm, slit (slit): 0.5 nm, lamp intensity: 3.5 mA.

3. Reagents

3.1. Ultrapure demineralised water resistivity 18.2 MΩ.m (e.g. Milli Q).

3.2. Stock solution to 1 g/l of copper: (eg. Titrisol Merck).

3.3. Solution 10 mg/1 of copper.

Place 2 ml of stock solution (3.2) in a 200 ml flask (2.1.1); fill to volume with demineralised water (3.1).

4. Sample preparation standard addition method

4.1. Evaporation of alcohol

Pipette (2.1.2) 50 ml of the alcoholic beverage in a 250 ml beaker (2.1.5). Evaporate the alcohol in a water bath to about one volume of 10 ml. Leave to cool, then pour the concentrate into a vial of 50 ml (2.1.1), rinse the beaker and fill to volume with demineralised water (3.1).

4.2. Add 0.2 mg/l of copper

Place 5 ml of the test sample (3.1) in a tablet bottle (1.1.3), add using the micropipette (1.1.4) 100 µl of the solution to 10 mg/l of copper (2.3).

4.3. Add 0.2 mg/l of copper

Place 5 ml of the test sample (4.1) in a tablet bottle (2.1.3), add using the micropipette (2.1.4) 200 µl of the solution to 10 mg/l of copper (3.3).

5. Determination

Successively present the test sample (4.1), the addition solutions (4.2), (4.3);

note the corresponding absorbances.

Establish the calibration curve for the additions: absorbance = f (concentration in mg/1 of copper) by the least squares method.

The concentration of copper is given by the intersection of the calibration curve for the additions absorbance = f (concentration mg/l of copper) with the x-axis.

6. Bibliography

- Compendium of International methods of wine and must analysis, O.I.V. ed.