

COMPENDIUM OF INTERNATIONAL METHODS OF ANALYSIS FOR SPIRITUOUS BEVERAGES  
AND ALCOHOLS  
Copper (Type IV)

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## **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 l/min

- C<sub>2</sub> H<sub>2</sub>: 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/l 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**

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## 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  $\mu$ l 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  $\mu$ l 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/l 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.