INTERNATIONAL STANDARD ISO 3094

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Fruit and vegetable products — Determination of copper content — Photometric method

Produits dérivés des fruits et légumes — Dosage du cuivre — Méthode photométrique

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3094 was drawn up by Technical Committee ISO/TC 34, *Agricultural food products,* and circulated to the Member Bodies in March 1973.

It has been approved by the Member Bodies of the following countries :

Austria	Hungary	South Africa, Rep. of
Brazil	India	Sri Lanka
Bulgaria	Ireland	Thailand
Canada	Israel	Turkey
Czechoslovakia	Netherlands	United Kingdom
Egypt, Arab Rep. of	Poland	U.S.S.R.
France	Romania	Yugoslavia

This International Standard has also been approved by the International Union of Pure and Applied Chemistry (IUPAC).

No Member Body expressed disapproval of the document.

Printed in Switzerland

Fruit and vegetable products — Determination of copper content — Photometric method

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the determination of copper in fruit and vegetable products.

NOTE — Bismuth and tellurium interfere with this method and the presence of these contaminants will lead to erroneous results.

2 REFERENCES

ISO . . ., *Fruits, vegetables and their derived products — Destruction of organic matter — Wet method.* [1]

ISO . . ., *Fruits, vegetables and their derived products — Destruction of organic matter — Ashing method.* [1]

3 PRINCIPLE

After destruction of organic matter, addition of sodium diethyldithiocarbamate to the previously neutralized acid solution. Extraction of the copper complex formed, by means of chloroform or carbon tetrachloride, and measurement of the intensity of the colour of the solution obtained.

4 REAGENTS

All reagents shall be of recognized analytical purity.

The water used shall be water distilled in borosilicate glass or silica apparatus, or water of at least equivalent purity.

The reagents to be used for destruction of organic matter shall be provided, and in addition :

4.1 Chloroform or **carbon tetrachloride,** phosgene-free.

4.2 Methanol, anhydrous (for this method 99 % methanol may be regarded as anhydrous).

4.3 Ammonia solution, ρ_{20} 0,88 g/ml.

4.4 Solution of ammonium citrate and disodium salt of ethylene-diaminetetraacetic acid (EDTA).

Dissolve 20 g of ammonium citrate and 5 g of disodium salt of EDTA in water and dilute to 100 ml.

4.5 Sodium diethyldithiocarbamate, 5 g/l solution.

NOTE — The solution of the reagent may be accelerated by heating in a water bath at 25 to 30 °C.

This solution shall have been prepared less than 1 week before use.

4.6 Standard copper solution, corresponding to 0,01 g of Cu per litre.

Dissolve 0,196 g of copper(II) sulphate ($CuSO_4.5H_2O$) in water to which a few drops of sulphuric acid, ρ_{20} 1,84 g/ml, have been added, and dilute to 500 ml with water. Take 10 ml of this solution and dilute it to 100 ml with water.

1 ml of this solution contains 10 μg of copper.

4.7 Thymol blue indicator solution.

Dissolve, by warming, 0,1 g of thymol blue in 8,6 ml of 0,1 N sodium hydroxide solution and 10 ml of 96 % (*V*/*V*) ethanol. Dilute to 250 ml with 20 % (*V*/*V*) ethanol.

5 APPARATUS

In addition to the equipment used for the destruction of organic matter, usual laboratory equipment not otherwise specified and the following items are required :

5.1 Separating funnel, short stemmed.

5.2 Spectrophotometer or **photoelectric absorptiometer,** suitable for measurements at a wavelength of 435 nm, fitted with cells of 10 or 20 mm optical path length.

6 PROCEDURE

6.1 Test portion and destruction of organic matter

Proceed in accordance with one of the documents referred to in clause 2.

NOTE — Milling and sieving of the sample, before destruction of organic matter, in equipment made of copper alloys should be avoided.

1) In preparation.