
INTERNATIONAL STANDARD



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Fruit and vegetable products — Determination of tin

Produits dérivés des fruits et légumes — Dosage de l'étain

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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 2447 was drawn up by Technical Committee ISO/TC 34, *Agricultural food products*, and circulated to the Member Bodies in July 1971.

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

Australia	Hungary	Portugal
Brazil	India	South Africa, Rep. of
Bulgaria	Iran	Spain
Chile	Israel	Thailand
Egypt, Arab Rep. of	Korea, Dem. P. Rep. of	Turkey
Finland	Netherlands	United Kingdom
France	Poland	

This International Standard has also been approved by the Association of Official Analytical Chemists (AOAC).

The Member Body of the following country expressed disapproval of the document on technical grounds :

Czechoslovakia

Fruit and vegetable products – Determination of tin

1 SCOPE AND FIELD OF APPLICATION

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

The method is applicable to products which may contain, per kilogram, up to :

- 1,25 g of copper;
- 0,6 g of lead;
- 0,6 g of zinc;
- 40 g of phosphorus.

2 REFERENCE

ISO . . . , *Fruit and vegetable products – Wet method for the destruction of organic matter.*¹⁾

3 PRINCIPLE

After destruction of the organic matter by means of sulphuric and nitric acids, and conversion of the tin to the stannic form, formation of a complex in a buffered solution of pH 1,0 to 1,2 (the iron(III) being masked, if necessary, by reduction with ascorbic acid), the complex being coloured orange with phenylfluorone and the colour compared with those obtained in the same conditions but starting from standard solutions of pure tin.

4 REAGENTS

All reagents used shall be of analytical reagent quality and the water used shall be distilled water or water of at least equivalent purity.

The following reagents are necessary, in addition to those used for the destruction of organic matter and specified in ISO . . . :

- 4.1 Sulphuric acid, ρ_{20} 1,84 g/ml.
- 4.2 Sulphuric acid, 2,5 N solution.
- 4.3 Ascorbic acid, 50 g/l solution.

- 4.4 Polyvinyl alcohol, 16 g/l solution.

Dissolve 1,6 g of polyvinyl alcohol in a little water with gentle warming and agitation. Dilute to 100 ml after cooling.

- 4.5 Buffer solution, containing 450 g of sodium acetate (CH_3COONa) and 240 ml of acetic acid (CH_3COOH) per litre.

- 4.6 Tin, standard volumetric solution, containing 500 $\mu\text{g/ml}$ in a sulphuric acid medium, approximately 6 N.

Dissolve, with heating, 0,5 g of pure tin in a mixture of 50 ml of sulphuric acid (4.1), 5 ml of nitric acid, ρ_{20} 1,42 g/ml, and 25 ml of water. After complete solution, oxidize the tin to the stannic form by boiling until white fumes appear.

Cool the solution and pour it into a 1 000 ml volumetric flask containing 116 ml of sulphuric acid (4.1) and 100 ml of water. Cool and dilute to 1 000 ml with water.

- 4.7 Tin, standard volumetric solution containing 10 $\mu\text{g/ml}$ in a sulphuric acid medium, approximately 0,5 N.

Transfer 20 ml of the tin standard volumetric solution (4.6) to a 1 000 ml volumetric flask. Add 10 ml of sulphuric acid (4.1) and dilute to 1 000 ml with water.

- 4.8 Phenylfluorone reagent (2, 6, 7-trihydroxy-9-phenyl-3-isoxanthone).

Dissolve 0,1 g of phenylfluorone in 10 ml of methanol and 1 ml of concentrated hydrochloric acid, ρ_{20} 1,19 g/ml, in a 500 ml volumetric flask. Dilute to the mark with 95 % (V/V) ethanol. The reagent shall be stored in a brown bottle in the dark. It is recommended that it should not be stored for longer than 1 week.

5 APPARATUS

Usual laboratory equipment not otherwise specified, in addition to that used for the destruction of organic matter and specified in ISO . . . , and in particular :

- 5.1 One-mark volumetric flasks, capacity 50 and 200 ml, complying with class A of ISO/R 1042.
- 5.2 Pipettes for delivering 1, 2, 3, 4, 5, 10 and 20 ml, complying with class A of ISO/R 648 or ISO/R 835.

1) In preparation.