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Fresh and quick-frozen maize and peas — Determination of alcohol-insoluble solids content

Maïs et petits pois frais et congelés — Détermination de la teneur en résidus insolubles dans l'alcool

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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ISO 23392 was prepared by Technical Committee ISO/TC 34, *Food Products*, Subcommittee SC 14, *Fresh, dry and dried fruits and vegetables*.

Fresh and quick-frozen maize and peas — Determination of alcohol-insoluble solids content

1 Scope

This International Standard specifies a method for the determination of the alcohol-insoluble solids content of fresh or quick-frozen peas and maize, as well as whole kernel maize.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
alcohol-insoluble solids content
whole of the compounds determined by the method specified in this International Standard and expressed as a percentage by mass

3 Principle

A properly prepared test portion is boiled with ethanol, followed by filtration and washing the solids with ethanol until the filtrate is clear. The alcohol-insoluble solids are dried and weighed. The result is used as a guide to maturity index.

4 Reagents

Use only reagents of recognized analytical grade, unless otherwise specified, and distilled or demineralized water or water of equivalent purity.

4.1 **Ethanol,** a volume fraction of 95 % denatured with a volume fraction of 5 % methanol.

4.2 **Diluted ethanol,** a volume fraction of 80 %. Dilute 8 volumes of ethanol (4.1) with 1,5 volumes of water.

5 Apparatus

Usual laboratory apparatus and, in particular, the following.

5.1 **Analytical balance,** capable of weighing to the nearest 0,001 g.

5.2 **Flask**, of capacity 250 ml, with a standard taper ground-glass joint, fitted with a reflux condenser**.**

5.3 **Buchner funnel.**

5.4 **Drying dish**, flat-bottomed, with a close-fitting lid.

5.5 **Boiling water bath.**

5.6 Thawing water-bath, with continuous flow at room temperature maintained at room temperature.

5.7 Plastic bag or vessel with screw-cap, of sufficient capacity to contain the entire test sample

5.8 Clamps or weights.

5.9 Sieve, of woven metal wire cloth, with square openings of 2,8 mm × 2,8 mm.

5.10 Desiccator, containing freshly activated dry silica gel, or an equivalent desiccant, with a water content indicator.

5.11 Oven, well-aerated thermostatically controlled at 100 °C ± 2 °C.

5.12 Filter paper.

5.13 High-speed blender or **chopper.**

5.14 Vacuum pump or **water aspirator.**

6 Procedure

6.1 Sample preparation

6.1.1 Preparation of fresh or quick-frozen peas

Allow deep-frozen peas to thaw before homogenization. Place the deep-frozen sample in the plastic bag (5.7) and tie it. Immerse the bag in the water bath (5.6). Avoid agitation of the bag during thawing, if necessary by using clamps or weights (5.8). When completely thawed, remove the bag from the water bath and blot off any adhering water. Transfer the peas from the bag to the sieve. (5.9). If liquid is present, wash by gently spraying with water at room temperature until the liquid is removed.

Without disturbing the peas, incline the sieve to facilitate drainage and allow draining for 2 min. Wipe the bottom of the sieve.

Mix the thawed or fresh laboratory sample to obtain a representative test sample.

Blend approximately 250 g of the test sample in the blender (5.13) with an equivalent mass of water until a smooth paste is obtained.

Weigh, to the nearest 10 mg, approximately 20 g of the paste and transfer to the flask (5.2). Add 120 ml of the ethanol (4.1) into the flask and stir.

6.1.2 Preparation of fresh or quick-frozen maize

Allow the deep-frozen maize to thaw in a closed vessel (5.7) in the water-bath (5.6), and add the liquid formed during this process to the product before homogenization.

Remove whole grains from the cob using a suitable instrument taking care not to damage individual grains. Spread the grains on a white background and remove the silk, husk cob and other extraneous vegetable material. By successive combing and quartering operations, reduce the sample to a representative subsample of mass approximately 100 g.

Blend the subsample to a smooth paste in the high-speed blender or chopper (5.13). If necessary, add cold water in the ratio of 25 g of water to 100 g of sample.

Weigh, to the nearest 10 mg, approximately 10 g of the subsample and transfer to the flask (5.2). If water was added, take a test portion of 12,5 g. Add 300 ml of the ethanol (4.1) into the flask and stir.

6.2 Determination

Boil the content of the flask obtained by 6.1.1 or 6.1.2 under reflux on the boiling water-bath (5.5) for 30 min.

Place the filter paper (5.12) in the dish (5.4), and dry in the oven (5.11), at 100 °C ± 2 °C, for 2 h, with the lid removed but alongside the dish. Cover the dish, allow it to cool in the desiccator (5.10) to ambient temperature for approximately 30 min and weigh to the nearest 1 mg. Fit the prepared filter paper into the Buchner funnel (5.3), with the edge of the paper at least 13 mm up the vertical sides of the funnel. Apply suction and transfer the contents of the flask to the Buchner funnel. Do not allow any of the material to run over the edge of the paper. Suck dry and wash the material on the filter paper with diluted ethanol (4.2) until the washings are clear and colourless.

Transfer the filter paper containing the residue into the dish and place it in the cold oven – avoiding, in this way, the formation of a crust – with the lid removed but alongside the dish. Heat to 100 °C ± 2 °C and maintain at this temperature for at least 2 h.

Remove the dish, cover it, and allow it to cool in the desiccator for approximately 40 min. Weigh to the nearest 1 mg. Continue the operations of heating, cooling and weighing until the difference between two successive weighings does not exceed 1 mg.

6.3 Number of determinations

Carry out two determinations on the same sample.

7 Calculation and expression of results

7.1 Calculation

The alcohol-insoluble solids content, w, expressed as a percentage by mass, is equal to

$$w = \frac{m_2 - m_1}{m_0} \times 100$$

where

m_0 is the mass, in grams, of the paste obtained by 6.1.1 or 6.1.2 and transferred to the flask (5.2);

m_1 is the mass, in grams, of the dish, lid and filter paper;

m_2 is the mass, in grams, of the dish, lid, filter paper and alcohol-insoluble solids.

If water was added (see 6.1), multiply the result by 1,25. Take as the result the arithmetic mean of the values obtained in the two determinations (6.3).

7.2 Expression of results

Express the analysis result to the first decimal place.

8 Repeatability

The absolute difference between two independent single test results, obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, will in not more than 5 % of cases be greater than 5 % of the arithmetic mean of the two results.

9 Test report

The test report shall specify:

a) all information necessary for the complete identification of the sample;

b) the sampling method used, if known;

c) the test method used, with reference to this International Standard;

d) all operating details not specified in this International Standard, or regarded as optional, together with details of any incidents which may have influenced the test result(s);

e) the test result(s) obtained, or, if the repeatability has been checked, the final quoted result obtained.