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Rice — Determination of amylose content

Riz — Détermination de la teneur en amylose

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Foreword

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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 6647 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Rice — Determination of amylose content

1 Scope and field of application

This International Standard specifies a method for the determination of the amylose content of uncooked, milled rice.

2 Reference

ISO 950, *Cereals — Sampling (as grain)*.

3 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1 amylose: Polysaccharide constituent of starch, the macromolecules of which have a predominantly linear structure.

3.2 amylopectin: Polysaccharide constituent of starch, the macromolecules of which have a branched structure.

3.3 milled rice: Rice obtained after a milling operation which involves removing from the husked rice all or part of its pericarp and germ.

4 Principle

Grinding of the rice to a fine flour to destroy the crystallinity of the starch in order to aid complete dispersion and gelatinization, followed by defatting of the flour. Dispersion of a test portion in sodium hydroxide solution, then addition of an iodine solution to an aliquot portion and spectrometric determination of the absorbance, at 620 nm, of the colour complex formed.

Reading of the amylose content of the sample from a calibration graph, prepared using mixtures of amylose and amylopectin to make allowance for the effect of amylopectin on the colour of the amylose-iodine complex of the test solution.

5 Reagents

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

5.1 Methanol, 85 % (V/V).

5.2 Ethanol, 95 % (V/V).

5.3 Sodium hydroxide, 1 mol/l solution.

5.4 Sodium hydroxide, 0,09 mol/l solution.

5.5 Acetic acid, 1 mol/l solution.

5.6 Iodine solution.

Weigh, to the nearest 5 mg, 2,000 g of potassium iodide in a weighing bottle fitted with a stopper. Add sufficient water to form a saturated solution. Add 0,200 g of iodine, weighed to the nearest 1 mg. When all the iodine has dissolved, transfer the solution quantitatively to a 100 ml volumetric flask, make up to volume with water and mix.

Prepare a fresh solution on each day of use and protect it from light.

5.7 Potato amylose, free of amylopectin, standard 1 g/l suspension.

5.7.1 Defat the amylose by refluxing with methanol (5.1) for 16 h in a Soxhlet extractor or for 4 h in a Goldfisch extractor at a rate of 5 to 6 drops/s (see note 1).

5.7.2 Spread the defatted amylose on a tray and leave for 2 days to allow evaporation of residual methanol and for moisture content equilibrium to be reached. Treat the amylopectin (5.8) and the test samples (8.1) similarly (see note 2).

5.7.3 Weigh $100 \pm 0,5$ mg of the defatted and conditioned amylose into a 100 ml volumetric flask. Carefully add 1 ml of ethanol (5.2), rinsing down any amylose adhering to the walls of the flask. Add 9,0 ml of 1 mol/l sodium hydroxide solution (5.3) and leave at ambient temperature for 15 to 24 h, without shaking to disperse the amylose.

Make up to volume with water and mix vigorously.

1 ml of this standard suspension contains 1 mg of amylose.

NOTES

1 The potato amylose should be pure and should be tested by amperometric or potentiometric titration. Some commercial preparations are impure and would give erroneously high results for the amylose content of rice samples. Pure amylose should bind 19 % to 20 % of its own mass of iodine.

2 Because the test samples, the amylose and the amylopectin are conditioned in the same environment, no correction for moisture content is necessary and the results are obtained on a dry milled rice basis.