

INTERNATIONAL STANDARD

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Rice — Determination of viscoelastic properties at various stages of cooking — Method using a viscoelastograph

*Riz — Détermination des propriétés viscoélastiques à différents temps
de cuisson — Méthode au moyen du viscoélastographe*



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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6648 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Sub-Committee SC 4, *Cereals and pulses*, in collaboration with the International Association for Cereal Science and Technology (ICC).

This second edition cancels and replaces the first edition (ISO 6648:1985), which has been technically revised.

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International Organization for Standardization

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Rice — Determination of viscoelastic properties at various stages of cooking — Method using a viscoelastograph

1 Scope

This International Standard specifies a method using a viscoelastograph for the determination of certain viscoelastic properties of rice (i.e. swelling, firmness, elastic recovery and viscoelastic index) at various stages of cooking.

It also gives a method for the determination of the quantity of water absorbed (i.e. the coefficient of water absorption) by the rice at the same stages of cooking.

This International Standard is applicable to all whole-grain rice (i.e. husked rice and milled rice) whether or not it has been subjected to technological treatments such as precooking or parboiling.

2 Definitions

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

2.1 firmness: Resistance of grains of cooked rice to crushing when subjected to stress. It is expressed in units of firmness.

2.2 elastic recovery: Tendency of grains of cooked rice to return to their initial form once the stress to which they have been subjected is released. It is expressed as a percentage.

2.3 coefficient of water absorption: Ratio of the mass of rice after cooking to the mass of the same rice before cooking.

2.4 swelling: Thickness of grains of rice after cooking. It is expressed in millimetres.

NOTE 1 Swelling is in reality the increase in volume of the rice during cooking. It can be measured as the increase in thickness of the grain by determining the thickness of the rice before and after cooking. Measurements of thickness

after various cooking times give a curve indicating the course of swelling.

2.5 viscoelastic index: Ten times the ratio of the mean value of the elastic recovery to the difference between the mean value of firmness and 100.

3 Principle

Cooking of a known quantity of whole grains of rice in boiling distilled water for various times. Weighing the "cooked" grains in order to establish the coefficient of water absorption. Determination, by means of a viscoelastograph, of the thickness of the grains of "cooked" rice, and of their thickness both when subjected to a constant force for a given time and after this force has been removed. From these values, determination of the swelling, firmness, elastic recovery and viscoelastic index. Preparation of graphs giving these parameters as a function of cooking time.

4 Apparatus

Usual laboratory equipment and, in particular, the following.

4.1 Viscoelastograph, or equivalent apparatus, equipped with a set of thickness gauges.

4.2 Thermoregulated bath, filled with a liquid (for example, a mixture of water and ethylene glycol), capable of operating at a temperature of $104\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, and equipped with a plate with holes suitable for accommodating 250 ml beakers.

4.3 Metal sieve, of aperture size 2 mm.

4.4 Flat tray, the base of which is covered by a sheet of sponge soaked in water.

4.5 Beakers, of 250 ml capacity.