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REPORT OF THE FORTY-EIGHTH SESSION

Addendum 2

**ANNEX II : DETERMINATION OF THE MOISTURE CONTENT FOR DRY FRUIT
(INSHELL NUTS AND NUT KERNELS)**

Note by the secretariat

This document contains the Annex as revised during the session of the Specialized Section. Delegations are invited to provide any relevant comments to the secretariat and the rapporteur (Spain) by 31 December 2001.

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ANNEX II

DETERMINATION OF THE MOISTURE CONTENT FOR DRY FRUIT (INSHELL NUTS AND NUT KERNELS)

METHOD 1 - LABORATORY REFERENCE METHOD

1. Scope and application

This reference method serves to determine the moisture and volatile matter content for both inshell nuts and shelled nuts (kernels).

2. Reference

This method is based on the method prescribed by ISO: ISO 665-2000 Oilseeds - Determination of moisture and volatile matter content.

3. Definition

Moisture content and volatile matter content for nuts: loss in mass measured under the operating conditions specified in ISO 665-2000 for oilseeds of medium size (see point 7.3 of ISO 665-2000). The moisture content is expressed as percentage by mass (grams per 100 grams).

4. Principle

Determination of the moisture and volatile matter content of a test portion by drying at $103 \pm 2^\circ \text{C}$ in an oven at atmospheric pressure, until practically constant mass is reached.

5. Apparatus (see ISO 665-2000 for more details)

- 5.1 Analytical balance sensitive to 1 mg or better.
- 5.2 Mechanical mill (and ceramic mortar with pestle, for shells)
- 5.3 3 mm round-holes sieve
- 5.4 Glass, porcelain or non-corrosive metal containers, provided with well-fitting lids, allowing the test portion to be spread.
- 5.5 Electric oven with thermostatic control capable of being regulated between 101 and 105° C in normal operation.
- 5.6 Desiccator containing an effective desiccant

6. Procedure

Follow the operating conditions as specified in ISO 665-2000 for oilseeds of medium size (point 7 and 7.3 of ISO 665-2000), but with the following specific modifications, concerning the preparation of the test sample:

- 6.a Determination of the moisture and volatile matter content of kernels:

Homogenize the laboratory sample and take a minimum of 100 g of kernels as a test sample. For inshell nuts, take a minimum of 200 g and remove the shells using a nutcracker or hammer, using the rest as a test sample (the cuticle or spermoderm of the kernel is included in the test sample).

Grind the test sample until the size of the particles obtained is no greater than 3 mm. During the grinding operation, care should be taken to avoid the production of a paste (oily flour), the overheating of the sample and the consequent loss of moisture content (for example, if using a mechanical food chopper, by successive very short grinding and sieving operations).

Spread evenly over the base of the vessel 5.0 to 50 g of the ground product as a test portion, replace the lid, and weigh the whole vessel. Carry out two determinations on the same test sample.

6.b Determination of moisture and volatile matter content on whole nuts (shell plus kernel):

Homogenize the laboratory sample and take a minimum of 1000 g of whole nuts as a test sample.

Grind the whole nuts using either a Rass Mill, a Romer Mill or a Brabender apparatus or similar, without overheating the product.

Spread evenly over the base of the vessel 5.0 to 50 g of the product as a test portion, replace the lid, and weigh the whole vessel. Carry out two determinations on the same test sample.

7. Expression of results and test report

Follow all the instructions as specified in ISO 665-2000 (point 9 and 11) for method of calculation and formulae, for repeatability, and for test report, without any modification. 1

METHOD 2: RAPID METHOD

1. Principle

1 *The main points specified are as follows:*

- *moisture and volatile matter content is expressed as a percentage of mass (g per 100 g of sample)*
- *the result is the arithmetic mean of the two determinations*
- *the result has to be reported to one decimal place*
- *repeatability: the difference between the two determinations should not exceed 0.2 g per 100 g of sample*
- *reproducibility: ISO 665-2000 doesn't specify any condition of reproducibility*

Determination of the moisture content using a measuring apparatus based on the principle of loss of mass by heating. The apparatus should include an halogen or infra-red lamp and a built-in analytical balance, calibrated according to the laboratory method.

2. Apparatus

- 2.1 Mechanical mill or food chopper.
- 2.2 3 mm round-holes sieve (unless indicated otherwise by the instructions for use of the apparatus)
- 2.3 Halogen or infra-red lamp with built-in analytical balance sensitive to 1 mg or better.

3. Procedure

- 3.1 Preparation of sample

Follow the same instructions as given for the laboratory reference method (points 6.a and 6.b), unless indicated otherwise by the instructions for use of the apparatus, particularly with regard to the diameter of the fragments.

- 3.2 Determination of moisture content

Carry out the determination on two test portions of approximately 5 to 10 g each, unless indicated otherwise by the instructions for use of the apparatus.

Spread the test portion over the base of the test receptacle, thoroughly cleaned in advance, and note the weight of the test portion to within 1 mg.

Follow the procedure indicated in the instructions for use of the apparatus for the product to be tested, in particular with regard to the adjusting of temperatures, the duration of the test and the recording of the weight readings.

4. Expression of results

- 4.1 Result

The result should be the arithmetic mean of the two determinations, provided that the conditions of repeatability (4.2) are satisfied. Report the result to one decimal place.

- 4.2 Repeatability

The difference in absolute value between the respective results of the two determinations performed simultaneously or one immediately after the other by the same operator, under the same conditions on identical test material, must not exceed 0.2%.

5. Test report

The test report must state the method used and the results obtained. The report must contain all information necessary for the full identification of the sample.