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REVISION OF THE STANDARD LAYOUT FOR DRY AND DRIED PRODUCE

ANNEX II: DETERMINATION OF THE MOISTURE CONTENT FOR DRY FRUIT

Transmitted by Spain

Note by the secretariat: The rapporteur (Spain) has prepared a new document for this annex which is based on TRADE/WP.7/GE.2/2001/13/Add.2.

ANNEX II

DETERMINATION OF THE MOISTURE CONTENT FOR DRY FRUIT

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 dry fruit: 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 **mass fraction, in percent, of the mass of the initial sample.** ~~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 to about 0.2 g/cm^2 (approximately 5 mm height).

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:

For shelled nuts, homogenize the laboratory sample and take a minimum of 100 g of kernels as a test sample. For inshell ~~nuts dry fruits~~, take a minimum of 200 g and, using a nutcracker or hammer, remove the shells **and fragments or particles of shell**, using the rest as a test sample. The **kernel skin** (cuticle or spermoderm) is included in the test sample.

Grind **and sieve** 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~~ **10** 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 dry fruits~~ (shell plus kernel):

Homogenize the laboratory sample and take a minimum of ~~4000~~ **200** g of dry fruits as a test sample. **Remove all the foreign matter (dust, stickers, etc.) from the 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~~ **15** 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, and for test report, without any modification. 1

8. **Precision**

For conditions of repeatability and reproducibility apply specifications of ISO 665-2000 (point 10.2 and 10.3) for soya beans.

1 The main points specified are as follows:

- moisture and volatile matter content is expressed as **mass fraction, in percent, of the mass of the initial sample. a percentage of mass (g per 100 g of sample)**
- the result is the arithmetic mean of the two determinations; **the difference between the two determinations should not exceed 0.2 % (mass fraction)**
- 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~~

METHOD 2: RAPID METHOD

1. Principle

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.
