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**Inspection of Grain and Oilseeds – Methods for
Determination of Moisture Content**

粮食、油料检验 水分测定法

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Inspection of Grain and Oilseeds – Methods for Determination of Moisture Content

This Standard applies to the determination of the moisture content of commodity grains and oilseeds.

1 Constant-Weight Method at 105°C

1.1 Instruments and utensils

1.1.1 Electric thermostat box;

1.1.2 Analytical balance: 0.001g;

1.1.3 Electric grinder or hand grinder for laboratory use;

1.1.4 Grain screening;

1.1.5 A desiccator equipped with color-changing silica gel (the color-changing silica gel cannot be used once it turns red, and it shall be dried at 130°C ~140°C until it turns blue before use).

1.1.6 Aluminum box: inner diameter 4.5cm, height 2.0cm.

1.2 Preparation of specimen

Take a certain sample from the average sample; and prepare the specimen according to the method specified in the table below.

W_1 – weight of specimen and aluminum box before baking, in g;

W_2 – weight of specimen and aluminum box after baking, in g.

When the moisture content of oilseed with shell is determined according to seed and shell respectively, the moisture content of oilseed with shell shall be calculated according to Formula (2):

$$\text{Moisture content (\%)} = M_1 \times A + M_2 \times (1 - A) \dots\dots\dots (2)$$

Where:

M_1 – moisture percentage of seed, in %;

M_2 – moisture percentage of shell, in %;

A – percentage of total seed that can be obtained, in %.

The allowable difference of the double test results shall be no more than 0.2%; calculate the average value, which is the measurement result. The measurement result retains the first digit after the decimal point.

When other methods are used to measure the water content, the result compared with this method shall not exceed 0.5%.

2 Baking Method at Fixed Temperature and Time

2.1 Instruments and utensils: The same as 1.1.

2.2 Preparation of specimen: The same as 1.2.

2.3 Calculation of the amount of specimen: This method uses quantitative specimens. First calculate the area of the bottom of the aluminum box; and then calculate the amount of the specimen as 0.126g per square centimeter (bottom area $\times$ 0.126). For example, if an aluminum box with a diameter of 4.5cm is used, the sample amount is 2 g; and if an aluminum box with a diameter of 5.5cm is used, the sample amount is 3 g.

2.4 Operation method

Weigh the quantitative specimen (accurate to 0.001g) by the aluminum box that has been baked to constant weight; and when the temperature of the oven rises to 135~145°C, put the aluminum box containing the specimen on the roast net around the thermometer in the oven; within 5 min, adjust the oven temperature to $130 \pm 2^\circ\text{C}$; start timing; take it out after 40 min of baking; put it in a desiccator to cool off, and weigh it.

2.5 Calculation of results

The calculation of moisture content by the method at fixed temperature and time shall be the same as 1.4.

3 Tunnel Oven Method

The tunnel oven method is used to determine the moisture content of cereal grains to bake at $160\pm 2^{\circ}\text{C}$ for 20 min. For the determination of the moisture content of oilseeds and beans, it is used to bake at $130\pm 2^{\circ}\text{C}$ for 30 min.

3.1 Instruments and utensils

3.1.1 Tunnel oven;

3.1.2 Stopwatch.

3.2 Preparation of specimen: The same as 1.2.

3.3 Operation method

3.3.1 Fix temperature: Lay the instrument flat; insert the thermometer into the baking chamber so that the mercury ball is about 1 cm away from the opening of the baking box; and then turn on the power supply to fix the temperature.

3.3.2 Weighing oven boxes: Push three clean oven boxes into the baking chamber; and push another one after 10 min. At this time, one of the oven boxes pushed first is pushed out of the tunnel; and it is placed on the weighing pan over the oven. Add 10 g of counterpoise; and adjust the screws on the paperscale so that the pointer points to the zero point of the gauge. Take off the counter poise and put the prepared specimen into the baking box; increase or decrease the specimen until the pointer stops at zero. Then distribute the weighed specimens evenly in the baking box; push them into the baking chamber; close the left door; and time at the same time.

3.3.3 Baking the specimen: When using the method of baking at 160°C for 20 min, push a baking box containing the specimen into the baking chamber every 6 min 40 s. When using the method of baking at 130°C for 30 min, push a baking box containing the specimen into the baking chamber every 10min. When the fourth specimen box is pushed in, the baking time of the first sample box is up; and it is pushed out onto the weighing pan; pull down the fixed support rod of the balance pointer; and observe the value pointed by the pointer, which is the measured moisture percentage.

The allowable difference between the double test results is no more than 0.5%.

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