Regional Economic Cooperation and Integration in Asia

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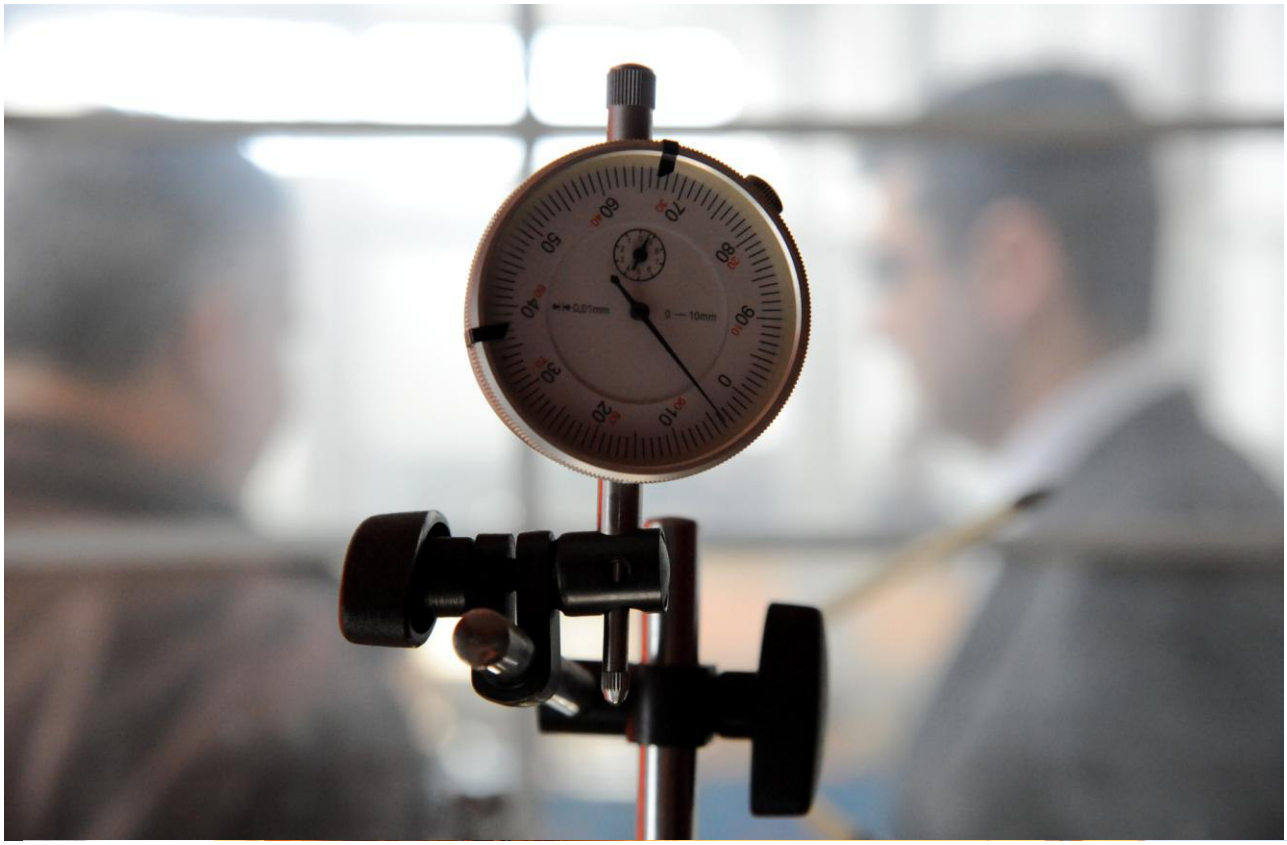

National Standard of People's Republic of China

GB/T 5494-2008

Inspection of grain and oils—Determination of foreign matter and unsound kernels of grain and oilseeds

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National Standard of the People's Republic of China

GB/T 5494-2008
Replaces GB/T 5794-1985

Inspection of grain and oils—Determination of foreign matter and unsound kernels of grain and oilseeds

Issued on Nov. 4, 2008

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Standardization Administration of the People's Republic of China

Foreword

This standard replaces GB/T 5494—1985 *Inspection of Grain and Oils—Determination of Foreign Matter and Unsound Kernels*.

Compared with GB/T 5494—1985, the main changes of this standard are as follows:

----Add the contents of normative references;

----Add the requirement of lighting in the operation of inspection;

----Add the inspection method of the unsound kernels of grain;

----Modify part of the operational method and result calculation;

----Delete the calculation of the ratio of pure grain (matter);

This standard is proposed by State Administration of Grain.

This standard is under the jurisdiction of the National Standardization Technical Committee of Grain and Oils.

This standard is mainly drafted by: Henan Quality Supervision and Inspection Station of Grain, Oil and Feed Products.

The organization that participated in the drafting of this standard is: Liaoning Grain and Oils Inspection and Supervision Institute.

Main drafters of this standard are: Yin Chenghua, Cui Guohua, Hu Jipeng.

The old version which is replaced by this standard is GB/T 5494-1985.

Inspection of grain and oils—Determination of foreign matter and unsound kernels of grain and oilseeds

1 Scope

This standard specifies the instrument and tool, lighting requirement, preparation of sample, operation method and result calculation for the inspection of foreign matter and unsound kernels of grain and oilseeds.

This standard is applicable to the determination of foreign matter and unsound kernels of grain and oilseeds.

2 Normative References

The following standards contain provisions which, referred by this standard, constitute provisions of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. However, it is encouraged for each party entering agreement according to this standard to decide whether to use the latest versions of these documents. In addition, the latest versions of all reference documents without dates are applicable to the standard.

GB 5491 Inspection of Grain and Oils Methods for sampling and sampling reduction

GB/T 22505 Inspection of Grain and Oils Sensory analysis environment—Lighting

3 Apparatus and Tools

3.1 Balance: Precision is 0.01g, 0.1g, 1g

3.2 Sieving machine for grain

3.3 Electric sieving machine

3.4 Sampler or sampling board

3.5 Analysis plate, tweezer, etc.

4 Requirement of Lighting

The lighting condition during operation should accord with the requirements in GB/T

22505.

5 Preparation of Samples

The samples for foreign matter inspection are divided into big samples and small samples. Big samples are used to inspect big foreign matters, including huge foreign matter and the matter which comes from the absolute sieving layer; small samples are the small amount of test samples which are from the samples that have gone through big samples inspection. The inspection of small samples aims at the foreign matter with the similar size of normal grain.

Prepare the test samples according to the requirements in Table 1 and in accordance with GB 5491.

Table 1 Provision on the quantity of test samples for inspection of foreign matter and unsound kernels

Name of Grain and Oilseeds	Quantity of big sample/g	Quantity of small sample/g
Small size: millet, sesame, rapeseed, etc.	~500	~10
Middle size: paddy, wheat, sorghum, red bean, cottonseed, etc.	~500	~50
Big size: soybean, corn, pea, sunflower seed, small broad bean	~500	~100
Huge size: peanut kernel, castor-oil seed, tung seed, tea seed, shiny-leaved yellowhorn, huge broad bean	~1000	~200
Others: inspection of sweet potato chips, rice with barnyard millet in husk and paddy	500~1000	

6 Operation Process

6.1 Inspection of foreign matter and unsound kernels of general grain and oilseeds

6.1.1 Sieving

6.1.1.1 Method of electric sieving: fix the sieving layer in accordance with the quality standard (big hole sifter on the top, small hole sifter at the bottom, fix the sieving bottom), put the samples into the sifter, cover the sifter, then put the sifter on the electric sieving, connect the electricity, turn on the switch, let the sieve sift automatically both from the left and right for 1min respectively (110 r/min~120r/min), wait for a while after the sieving, pour-out the samples from up sifter and bottom sifter on the analysis plates separately. The particles stuck on the sifter belong to the up sifter samples.

6.1.1.2 Method of manual sieving: fix the sifter layers by the same method in 6.1.1.1, pour in the test samples, and cover the sifter. Put the sifter on the glass board or a smooth desk, rotate by hands clockwise and the opposite direction for 1 min each at the speed of 110 times/min ~ 120 times /min. The sifter moves within 8cm~10cm broader than its diameter. The following process is the same with 6.1.1.1.

6.1.2 Inspection of Big Foreign Matter

Get big test samples from the average samples according to quantity requirement (m) in Table 1 and the provision of Chapter 5 and the quantity should be precise to 1 g. Sift twice (4 times for huge grain and oilseeds) in accordance with the sieving method provided in 6.1.1, pick out the huge foreign matter on and at the bottom of the sifter, mix and weigh the matter (m_1), precise to 0.01 g (the foreign matter of wheat should be picked on 4.5 mm layer of the sifter).

6.1.3 Inspection of Small Foreign Matter

Get small test samples from the samples which have gone through inspection of big foreign matters according to quantity requirement (m_2) in Table 1 and the provision of Chapter 5. The quantity should be precise to 0.01 g when samples are no more than 100 g; precise to 0.1 g when the samples are more than 100 g. Pour samples into the analysis plate, pick out the foreign matter according to the quality standard,

and weight them (m_3). The weight should be precise to 0.01 g.

6.1.4 Inspection of Mineral Substance

If there is index specification on mineral substance (excluding rice), pick out the mineral substance in the small foreign matter and weigh the substance (m_4). The weight should be precise to 0.01 g.

6.1.5 Inspection of Unsound Kernels

The unsound kernels should be picked out according to the quality standard while the small foreign matter is inspected, and weigh them (m_5). The weight should be precise to 0.01 g.

6.2 Inspection of Foreign Matter and Unsound Kernels of Rice

6.2.1 Inspection of total weight of bran powder, mineral substance and foreign matter

About 200g (m') samples should be prepared precise to 0.1 g and according to the requirement in chapter 5, put at twice the samples into the round hole sifter whose diameter is 1.0 mm, sieve by the method in 6.1.1, and pat the sifter to drop the bran powder to bottom of the sifter. After sieving all the samples, brush the bran powder left on the sifter layer, mix the power and weigh it (m_1'). The weight should be precise to 0.01 g. Pour the matter on the sifter into the analysis plate (particles stuck in the sifter layers belong to the samples on the top layer of the sifter). Then pick out the mineral substance from the samples which have gone through inspection of bran powder, and weigh them (m_2'). The weight should be precise to 0.01 g. Pick out the paddy, barnyard millet in husk and other foreign matter, mix and weigh them (m_3'). The weight should be precise to 0.01g.

6.2.2 Inspection of barnyard millet and patty in husk

Get about 500 g test samples in accordance with the requirement in chapter 5. The weight should be precise to 1 g. Pick out the barnyard millet (X) and paddy (Y) in husk, and weigh them separately.

6.2.3 Inspection of Unsound Kernels

Get the test samples in accordance with the provision in Chapter 5 and to the

quantity (m_4') (the quantity of rice samples is the same with the unprocessed rice) required in Table 1. The weight should be precise to 0.01 g. Pour the samples into the analysis plate, pick out the unsound kernels according to the quality standard of grain and oilseeds, then weigh them (m_5'). The weight should be precise to 0.01 g.

7 Result Calculation

7.1 Inspection Result Calculation of Foreign Matter and Unsound Kernel of General Grain and Oilseeds

7.1.1 Content of big foreign matter (M) is identified by weight percent (%), and calculated by the following formula (1):

$$M = \frac{\mathrm{m1}}{\mathrm{m}} \times 100 \text{----------(1)}$$

Where:

m_1------weight of big foreign matter, in the unit of gram (g)

m------weight of big sample, in the unit of gram (g)

In the condition of repetitive operation, the absolutely difference value between two independent test data should be no more than 0.3%. The average of the two test data is the test result, which keeps 1 bit behind the decimal point.

7.1.2 Content of small foreign matter (N) is identified by weight percent (%), and calculated by the following formula (2):

$$N = (100 - \mathrm{M}) \times \frac{m3}{\mathrm{m2}} \text{----------(2)}$$

Where:

m_3------ weight of small foreign matter, in the unit of gram (g)

m_2------ weight of small sample, in the unit of gram (g)

In the condition of repetitive operation, the absolutely difference value between two independent test data should be no more than 0.3%. The average of the two test data is regarded as the test result, which keeps 1 bit behind the decimal point.

7.1.3 Mineral substance content (A) is identified by weight percent (%), and calculated by the following formula (3):

$$A = (100 - \mathrm{M}) \times \frac{m4}{\mathrm{m2}} \text{----------(3)}$$

Where:

m_4------weight of mineral substance, in the unit of gram (g)

m_2------weight of small sample, in the unit of gram (g)

In the condition of repetitive operation, the absolutely difference value between two independent test data should not be more than 0.1%. The average of the two test data is regarded as the test result, which keeps 2 bit behind the decimal point.

7.1.4 The total content of foreign matter (B) is identified by weight percent (%), and calculated by the following formula (4):

$$B = \mathrm{M} + \mathrm{N} \text{----------(4)}$$

Remain 2 bits behind the decimal point.

7.1.5 Unsound kernel (C) is identified by weight percent (%), and calculated by the following formula (5):

$$C = (100 - \mathrm{M}) \times \frac{m5}{\mathrm{m2}} \text{----------(5)}$$

where:

m_5------weight of unsound kernels, in the unit of gram (g)

m_2------weight of small sample, in the unit of gram (g)

In the condition of repetitive operation, the absolutely difference value between two independent test data should be no more than 1.0% for big sized and huge sized grain, and no more than 0.5% for the middle and small sized grain. The average of the two test data is regarded as the test result, which keeps 1 bit behind the decimal point.

7.2 Result calculation of foreign matter, unsound kernels of rice

7.2.1 Content of bran powder (E) is identified by weight percent, and calculated by the following formula（6）:

$$E = \frac{m1'}{m'} \times 100 \text{----------(6)}$$

Where :

m_1'------weight of bran powder, in the unit of gram (g)

m'------weight of test sample, in the unit of gram (g)

In the condition of repetitive operation, the absolutely difference value between two independent test data should be no more than 0.04%. The average of the two test data is regarded as the test result, which keeps 2 bits behind the decimal point.

7.2.2 Content of mineral substance (A) is identified by weight percent, and calculated by the following formula（7）:

$$A = \frac{m2'}{m'} \times 100 \text{----------(7)}$$

Where:

m_2'------weight of mineral substance, in the unit of gram (g)

m'------weight of test sample, in the unit of gram (g)

In the condition of repetitive operation, the absolutely difference value between two independent test data should no more than 0.005%. The average of the two test data is regarded as the test result, which keeps 2 bits behind the decimal point.

7.2.3 Total weight of foreign matter (B) is identified by weight percent (%), and calculated by the following formula（8）:

$$B = \frac{(m1'+m2'+m3')}{m'} \times 100 \text{----------(8)}$$

Where :

m_1'------weight of bran powder, in the unit of gram (g)

m_2'------weight of mineral substance, in the unit of gram (g)

m_3'------total weight of patty and barnyard millet in husk and other foreign matter, in the unit of gram (g)

m'------weight of test sample, in the unit of gram (g)

In the condition of repetitive operation, the absolutely difference value between two independent test data should no more than 0.04%. The average of the two test data is regarded as the test result, which keeps 2 bits behind the decimal point.

7.2.4 Barnyard millet in husk (F), the unit is kernel(s)/kg, calculated by the following formula (9):

$$F = 2 \times X \text{----------(9)}$$

Where:

X------Number of barnyard millet in husk which is pick out from 500g samples, the unit is kernel(s)

In the condition of repetitive operation, the absolutely difference value between two independent test data should be no more than 3 kernels/kg. The average of the two test data is regarded as the test result. It should be calculated as one kernel when the average is less than one kernel.

7.2.5 Paddy（I）, the unit is kernel(s)/kg, calculated by the following formula (10):

$$I = 2 \times Y \text{----------(10)}$$

Where :

Y------Number of barnyard millet in husk pick out from 500g test samples, the unit is kernel(s).

In the condition of repetitive operation, the absolutely difference value between two independent test data should be no more than 2 kernel(s)/kg. The average of the two test data is regarded as the test result. It should be calculated as one kernel when the average is less than one kernel.

7.2.6 Content of unsound kernels（C）is identified by weight percent (%), calculated by the following formula (11):

$$C = \frac{m4'}{m'} \times 100 \text{----------} (11)$$

Where :

m_4'------weight of unsound kernels of rice, in the unit of gram (g);

m'------weight of test sample, in the unit of gram (g);

In the condition of repetitive operation, the absolutely difference value between two independent test data should be no more than 1.0% for big and huge grains, no more than 0.5% for middle and small grains. The average of the two test data is regarded as the test result, which keeps 1 bit behind the decimal point.

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