UDC 633.3 : 620.1

Ref. No.: ISO/R 605 - 1967 (E)

Louise

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 605

PULSES

METHODS OF TEST

1st EDITION
August 1967

Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 605, *Pulses – Methods of Test,* was drawn up by Technical Committee ISO/TC 34, *Agricultural Food Products,* the Secretariat of which is held by Office Hongrois de Normalisation (MSZH).

Work on this question by the Technical Committee began in 1959 and led, in 1964, to the adoption of a Draft ISO Recommendation.

In June 1964, this Draft ISO Recommendation (No. 793) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Argentina	Greece	Romania
Australia	Hungary	Spain
Canada	India	Switzerland
Chile	Iran	Turkey
Czechoslovakia	Israel	U.A.R.
Denmark	Korea, Rep. of	United Kingdom
France	New Zealand	U.S.S.R.
Germany	Poland	

One Member Body opposed the approval of the Draft:

Netherlands.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in August 1967, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 605 August 1967

PULSES
METHODS OF TEST

1. SCOPE

This ISO Recommendation describes methods for testing pulses which have not been processed and are intended for human consumption or for animal feeding stuffs.

2. DETERMINATION OF IMPURITIES

2.1 Preparation of sample

Thoroughly mix the final lot sample obtained according to ISO Recommendation R , Pulses – Sampling, * and reduce it if necessary, by means of an automatic divider or by hand, to obtain the test portions specified in clause 2.2.

2.2 Test portions

The minimum test portion, for one determination, should be 200 g, except for butter beans *(Phaseolus lunatus L.)* and horse beans *(Vicia faba L.)* for which it should be 300 g.

If the content of impurities is very small, it may be necessary to increase considerably the test portion.

2.3 Procedure

Separate the test portion into component groups in order to obtain information on the use for which the lot is suitable.

Generally the test portion is separated into five groups, as follows:

(1) seeds typical of the species and variety;
(2) seeds typical of the species but of another variety;
(3) defective seeds belonging to the same species;
(4) organic impurities;
(5) inorganic impurities.

2.3.1 *Seeds typical of the species and variety.* This group includes all the intact sound seeds, those with a cracked or injured seed-coat, seeds slightly infested by insects, and broken seeds larger than one half their original size.

Each country is permitted to subdivide this group if desired.

2.3.2 *Seeds typical of the species but of another variety.* This group includes seeds of varieties which differ significantly in shape, size, colour or appearance.

2.3.3 *Defective seeds belonging to the same species.* This group includes broken, bitten and injured seeds equal to, or less than, one half their original size; seeds visibly damaged by insects; shrivelled, unripe, germinated seeds; rotten, mouldy and diseased seeds.

2.3.4 *Organic impurities.* This group includes seed-coats, parts of stems, pods, leaves, etc., other crop seeds and weed seeds.

2.3.5 *Inorganic impurities.* This group includes earth, sand, dust, stones, etc.

* At present Draft ISO Recommendation No. 1235.

3. DETERMINATION OF SIZE

(of pulses intended for human consumption)

Carry out the determination of size on material falling within the groups described in clauses 2.3.1 and 2.3.2.

According to the species of pulse, use either sieves with round holes (for example, for peas and lentils) or with suitable elongated holes (for example, for beans).

4. DETERMINATION OF THE MASS OF 1000 GRAINS

Carry out the determination as described in ISO Recommendation R 520, *Cereals and Pulses – Determination of the Mass of 1000 Grains.*

5. TESTS FOR PRESENCE OF FOREIGN ODOURS

5.1 This examination should be carried out as soon as possible after sampling, either on the sample in its original condition or on the ground sample.

Spread the sample and smell it. If no strong foreign odour is observed, seal the sample again for 24 hours and then check it anew. The sample may be examined also during the grinding operation. If after these operations no foreign odour can be detected with certainty, put about 3 to 5 g of the ground seed into a flask of 50 to 100 ml capacity. Cautiously moving the open flask over a flame or repeatedly shaking it in a water-bath, examine the sample at a temperature not higher than 60 °C.

5.2 A rapid method (enhancing the development of the odour) is to put a small quantity of the product in a beaker, pour in some warm water (60 to 70 °C), cover, after 2 or 3 minutes decant the water and note whether foreign odours are present.

6. TESTS FOR INFESTATION BY INSECTS

The presence of insect pests, especially adults or larvae of the house moth type (e.g. *Endrosis* or *Hofmannophila species*) or *Bruchid* species, either on sacks or inside the bulk, should be noted.

Examine for infestation by the X-ray method described in ISO Recommendation R , * *Cereals and Pulses – Method of Test for Infestation by X-ray Examination.* If this is not possible, use one of the methods described below, which are strictly qualitative.

(1) Test for visible infestation,
(2) Test for infestation by Bruchid beetles on peas by flotation,
(3) Test for infestation by Bruchid beetles on peas by a chemical procedure.

6.1 Test for visible infestation

Scatter part of the laboratory sample on a warm plate (about 40 °C) and cover immediately with a bell jar in order to prevent the escape of the beetles. In warm climates it may be advisable to cool the sample and then to sieve it quickly through a sieve of aperture 2 mm. Thus, the adult insects can easily be collected in a test tube and, if it is desired to know whether living beetles are present, the closed test tube can be warmed for a few minutes by hand.

If no living insects are observed within 15 minutes, open if possible 100 of the obviously infested seeds to check the possible presence of living or dead beetles and larvae. Examine the samples also for lace (filet) produced by the larvae of the house moth and related species.

* At present Draft ISO Recommendation No. 1236.

6.2 Test for infestation by Bruchid beetles on peas by flotation

6.2.1 *Preparation of salt solution.* Use a solution of sodium chloride or of ammonium nitrate, made by dissolving 400 to 500 g of salt in 1 litre of water. To facilitate solution, use warm water. After cooling, filter the solution through gauze.

6.2.2 *Procedure.* Put 500 peas in the vessel and mix the contents thoroughly. The sound seeds sink down while the infested ones rise to the surface. Skim the latter by means of a suitable strainer. Count the peas attacked by beetles and cut the others open with a knife. Count also the peas containing larvae, nymphs or adults. Determine thus the total number of peas infested by living or dead parasites in relation to the number of peas examined, and express the infestation as a percentage.

NOTE. — With peas or beans of 13 to 15% moisture content, the solution should have a density of at least 1.13 g/ml (18% sodium chloride); this will cause seeds containing adult beetles to float, provided that the insect has perforated the seed-coat. A liquid of density 1.20 g/ml or more is required in order to float the seeds containing immature insects, but at this point a considerable proportion of the unaffected seeds will also float. Seeds containing immature insects generally behave in the same way as clean seeds and a flotation method therefore tends to give a low result. The flotation method should be considered as a sorting test and not equivalent to the methods specified in clauses 6.1 and 6.3.

6.3 Test for infestation by Bruchid beetles on peas by a chemical procedure

6.3.1 *Preparation of test solution.* Use a 1% solution of iodine with potassium iodide, or a 2% tincture of iodine.

Prepare the solution of iodine with potassium iodide as follows: put 10 g of potassium iodide in a flask with a ground glass stopper and dissolve it in some water. Add to the solution 5 g of crystalline iodine and shake until the iodine is completely dissolved. Dilute to 500 ml with water.

To obtain a 2% tincture of iodine, take 500 ml of 96% (v/v) ethanol and dissolve in it 10 g of crystalline iodine.

6.3.2 *Procedure.* Take 500 peas, put them on a sieve and immerse the sieve in the test solution. Subsequently immerse the sieve with the seeds in a 0.5% potassium hydroxide (or sodium hydroxide) solution. Now take out the sieve with the peas from the solution and rinse with cold water for 20 seconds. The entry openings of the larvae and the points of attack are stained black by this treatment. The peas on the surface of which round black spots are observed are considered as infested. The examination should be carried out as soon as possible, since the discoloration will gradually fade.

NOTE. — By agreement between seller and buyer the state of development of the beetles may be determined as follows: open visibly infested seeds and count separately the living and dead insects (larvae, nymphs and adults).

7. COOKING QUALITY

See ISO Recommendation R , * *Pulses – Determination of Cooking Quality.*

8. TEST OF SPECIES AND VARIETY

By examination of the seeds, species and variety can be determined using morphological, physical and chemical methods.

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* At present at the stage of draft proposal.

8.1 Determination of rogues in lots of harvest peas

Use the morphological method, see clause 8.1.1, or, if the two kinds of peas cannot be distinguished in this way, use the chemical method, see clause 8.1.2, or the quartz lamp method, see clause 8.1.3. Carry out four tests in parallel, take the mean and express the result as a percentage.

8.1.1 *Morphological method.* The value of harvest peas when containing light-coloured seeds, for human consumption, is lowered by the presence of rogues. Generally, it is not difficult to distinguish them from each other. The colour of harvest peas is, as a rule, light yellow or green, their hilum has, in almost all cases, a light shade. The seed-coat of the rogue is uniformly grey, or showing violet spots or a marbled brown. The hilum is brown or black.

8.1.2 *Chemical method.* Soak the selected seeds in water at room temperature for 3 hours. The test can be accelerated by boiling the seeds for 20 minutes instead of soaking them. If the swelling of the seeds proceeds slowly, extend the period of soaking or boiling. Score the seed-coats of seeds that do not swell.

When the seeds are swollen, decant the water and place them in a glass vessel containing a 1 % solution of potassium carbonate or a 5 % sodium hydroxide solution. After 5 to 10 minutes, a dark discoloration (brown or black) can be observed on the seeds or on the hila of the rogues, whereas the harvest peas do not change their colour.

8.1.3 *Quartz-lamp method.* Carry out the test with ultra violet light. The seeds of harvest peas show a blue or pink fluorescence, slightly shaded by violet, whereas the rogues show a brownish shade.

8.2 Determination of lentil vetch (Vicia sativa var. lentilsperma) occuring in lentils as an impurity

8.2.1 *Morphological method.* Lentil vetches are characterized by rather thick borders of the seeds, by deep centres of the hila and by larger hila than those of the lentils. Lentil seeds have thinner borders and exhibit darker colours along the borders.

8.2.2 *Quartz-lamp method.* Remove the seed-coat from the two flat sides of the seeds and examine them in ultraviolet light. Lentil seeds show a greenish grey fluorescence, whereas lentil vetch seeds show a pink fluorescence.

8.3 Examination of sweet and of bitter seeds of lupins

8.3.1 *Chemical method*

8.3.1.1 *Test solution.* Prepare a solution of iodine and potassium iodide as follows: dissolve 60 g of iodine and 93 g of potassium iodide in 1 litre of water; before use, leave this stock solution to stand for 2 to 3 days. For each test, dilute 75 ml of the stock solution with water to 1 litre and leave it to stand for 24 hours.

8.3.1.2 *Procedure.* Form a test portion by drawing 100 seeds four times. In the case of sweet yellow lupins and bitter lupins, cut the seeds in two and immerse half of them in the test solution (see clause 8.3.1.1), at a temperature close to 20 °C, for a few seconds, then rinse with water.

The cut surface of the seeds of bitter lupins shows a dark brown colour, while that of the sweet ones shows a light yellow colour.

The seeds of sweet white lupins may be immersed in the test solution (see clause 8.3.1.1), for 2 to 5 minutes, without previous cutting.

The seeds will be coloured dark green. Rinse them in lukewarm water until the sweet lupin seeds become white and the bitter ones rusty brown. Seeds having a hard seed coat will not become green, they only assume a light rusty brown colour.

If the distinction is rather doubtful, these seeds may be also cut in halves and the cut surface coloured.

8.3.2 *Quartz-lamp method.* Under the ultra violet light the cut surface of the bitter lupin seeds becomes fluorescent, whereas the surface of the sweet ones remains dark.

9. DETERMINATION OF GLYCOSIDIC HYDROCYANIC ACID

See ISO Recommendation R *, *Pulses – Determination of Glycosidic Hydrocyanic Acid.*

* At present at the stage of draft proposal.