COMMISSION REGULATION (EEC) No 1387/78
of 23 June 1978
laying down the method for determining the minimum bread-making quality of common wheat

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Regulation (EEC) No 2727/75 of 29 October 1975 on the common organization of the market in cereals (1), as last amended by Regulation (EEC) No 1254/78 (2), and in particular Article 4 (3) thereof,

Having regard to Council Regulation (EEC) No 1256/78 of 12 June 1978 laying down the minimum requirements for common wheat for bread-making (3),

Whereas common wheat is considered to be of minimum bread-making quality when its chemical and biochemical properties are satisfactory, and when, after milling the wheat to flour, mechanical handling of the dough obtained from such flour is possible; whereas, in order to assess the behaviour of the dough subjected to mechanical handling for bread-making purposes, it is sufficient to apply only the first part of the European baking test developed at the Commission's request by a group of Community laboratories;

Whereas the measures provided for in this Regulation are in accordance with the opinion of the Management Committee for Cereals,

HAS ADOPTED THIS REGULATION:

Article 1

Common wheat shall be considered to be of minimum bread-making quality when the amylase activity of the ground grain is acceptable and when, after milling the wheat to flour, the dough obtained from such flour proves to be non-sticky and machinable.

Article 2

The amylase activity of the ground grain shall be considered to be acceptable if the falling number is not less than 160 seconds.

The falling number shall be determined in accordance with the methods recognized by the International Association for Cereal Chemistry (ICC), the standards of which are laid down under the following heading:

— No 107: determination of the falling number (according to Hagberg-Perten) as a measure of the degree of alpha amylase activity in grain and flour.

Article 3

To be considered as non-sticky and machinable, the dough shall meet the following requirements:

(a) at the end of the mixing, the dough should form a coherent mass which hardly adheres to the sides of the bowl and spindle of the mixer. It should be possible to collect the dough easily by hand and remove it from the mixing bowl in a single motion without noticeable loss;

(b) during moulding, the dough should adhere hardly, or not at all, to the sides of the dough moulding chamber so that it can freely rotate around itself and form a regular ball. At the end of the operation the dough should not stick to the sides of the chamber when the lid of the chamber is raised.

These characteristics shall be assessed by applying the first part of the European baking test according to the standard method set out in the Annex hereto.

Article 4

The costs relating to the baking test and the test of amylase activity shall be borne by the offerer. In the event of a dispute, the intervention agency shall submit the common wheat in question to a further baking test, the cost of which shall be borne by the losing party.

Article 5

This Regulation shall enter into force on the third day following its publication in the *Official Journal of the European Communities.*

It shall apply with effect from 1 August 1978.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 23 June 1978.

For the Commission
Finn GUNDELACH
Vice-President

(1) OJ No L 281, 1. 11. 1975, p. 1.
(2) OJ No L 156, 14. 6. 1978, p. 1.
(3) OJ No L 156, 14. 6. 1978, p. 4.

ANNEX

PRACTICAL REFERENCE METHOD FOR DETERMINING THE MINIMUM BREAD-MAKING QUALITY OF COMMON WHEAT

1. Title

Method for test baking of wheat flour.

2. Scope

The method is applicable to flour, experimentally milled from wheat for the production of yeast raised bread (see also 10.3)

3. Principle

A dough is made from flour, water, yeast, salt and sucrose, in a specified mixer. After dividing and rounding, the pieces are given 30 minutes rest ; they are moulded, placed on baking sheets and baked after a final proof of fixed duration. Dough handling properties are noted. The loaves are judged by volume and height.

4. Ingredients

4.1. Yeast

Active dry yeast Engedura (Gist-Brocades NV, Yeast Division) or a product having the same characteristics.

4.2. Water

Tap water.

4.3. Sugar-salt-ascorbic acid solution

Dissolve 30 ± 0·5 g of sodium chloride (commercial grade), 30 ± 0·5 g of sucrose (commercial grade), and 0·040 ± 0·001 g ascorbic acid in 800 ± 5 g of water. Prepare fresh daily.

4.4. Sugar solution

Dissolve 5 ± 0·1 g sucrose (commercial grade) in 95 ± 1 g of water. Prepare fresh daily.

4.5. Enzyme active malt flour

Commercial grade.

5. Equipment and apparatus

5.1. Baking room

Controlled to maintain a temperature of 22 to 25 °C.

5.2. Refrigerator

For maintaining a temperature of 4 ± 2 °C.

5.3. Balance

Maximum load 2 kg, accuracy 2 g.

5.4. Balance

Maximum load 0·5 kg, accuracy 0·1 g.

5.5. Analytical balance

Accuracy $0{\cdot}1 \cdot 10^{-3}$ g.

5.6. Mixer

Stephan UMTA 10, with mixing arm model 'Detmold' (A. Stephan Söhne GmbH) or similar equipment having the same characteristics.

5.7. Proving cabinet

Controlled to maintain a temperature of 30 ± 1 °C.

5.8. Open plastic boxes

Made from polymethylmethacrylate (Plexiglas, Perspex). Inside dimensions : 25 × 25 × 15 cm height, wall thickness 0·5 ± 0·05 cm.

5.9. Square plastic sheets

Made from polymethylmethacrylate (Plexiglas, Perspex). At least 30 × 30 cm, thickness 0·5 ± 0·05 cm.

5.10. Moulder

Brabender ball homogenizer (Brabender OHG) or similar equipment having the same characteristics.

5.11.

5.12.

5.13.

6. Sampling

According to ICC Standard No 101.

7. Procedure

7.1. Determination of water uptake

Determine the water absorption according to ICC Standard No 115 (see also 10.1).

7.2. Determination of malt flour addition

Determine the 'falling number' of the flour according to ISO 3093-1974. If the 'falling number' is higher than 250, determine the malt flour addition required to bring the 'falling number' within the range 200 to 250, using a series of mixtures of the flour with increasing quantities of malt flour (4.5). If the 'falling number' is lower than 250, no malt flour is required.

7.3. Reactivation of active dry yeast

Adjust the temperature of the sugar solution (4.4) to 35 ± 1 °C. Pour one part by weight of the active dry yeast into four parts by weight of this tempered sugar solution. Do not stir. Swirl if necessary.

Allow to stand for 10 ± one minutes, then stir until a homogeneous suspension is obtained. Use this suspension within 10 minutes.

7.4. Temperature adjustment of the flour and the dough liquid.

The temperature of the flour and the water must be adjusted to give a dough temperature of 27 ± 1 °C after mixing.

7.5. Dough composition

Weigh, with a precision of 2 g, 10 y/3 g flour on as-is moisture basis (corresponding to 1 kg flour on a 14 % mb), in which 'y' is the quantity of flour used in the farinograph test (see ICC Standard No 115, clause 9.1).

Weigh, with a precision of 0·2 g, the quantity of malt flour necessary to bring the 'falling number' within the range 200 to 250 (7.2).

Weigh 430 ± 5 g sugar-salt-ascorbic acid solution (4.3) and add water to a total mass of (x—9) · 10y/3 g (see 10.2) in which 'x' is the quantity of water used in the farinograph test (see ICC Standard No 115, clause 9.1). This total mass (usually between 450 and 650 g) must be achieved with a precision of 1·5 g.

Weigh 90 ± 1 g yeast suspension (7.3).

Note the total mass of the dough (P), which is the sum of the masses of flour, sugar-salt-ascorbic acid solution plus water, yeast suspension, and malt flour.

7.6. Mixing

Before starting, bring the mixer to a temperature of 27 ± 1 °C by use of a suitable quantity of tempered water.

Place the liquid dough ingredients in the mixer and place the flour plus malt flour on top.

Start the mixer (speed 1, 1 400 rev./min. and allow to run for 60 seconds. 20 seconds after the start of mixing, turn the scraper attached to the lid of the mixing bowl two revolutions.

Measure the temperature of the dough. If it is outside the range 26 to 28 °C, discard the dough and mix a new one after adjustment of ingredient temperatures.

Note dough properties using one of the following terms :

— non-sticky and machinable, or

— sticky and non-machinable.

To be considered as 'non-sticky and machinable' at the end of mixing, the dough should form a coherent mass which hardly adheres to the sides of the bowl and spindle of the mixer. It should be possible to collect the dough by hand and remove it from the mixing bowl in a single motion without noticeable loss.

7.7. Dividing and rounding

Weigh, with precision of 2 g, three pieces of dough according to the formula :

$p = 0{\cdot}25\ P$ where :

p = mass of scaled dough piece ;

P = total mass of dough.

Immediately round the pieces for 15 seconds in the moulder (5.10) and place them for 30 ± 2 minutes on the square plastic sheets (5.9), covered by the inverted plastic boxes (5.8) in the proving cabinet (5.7). Do not use dusting flour.

7.8. Moulding

Bring the pieces of dough on the plastic sheets, covered by the inverted boxes, to the moulder (5.10), and re-round each piece for 15 seconds. Do not remove cover from a piece of dough until immediately before rounding. Note dough properties again, using one of the following terms :

— non-sticky and machinable, or

— sticky and non-machinable.

To be considered as 'non-sticky and machinable' the dough should adhere hardly, or not at all, to the sides of the chamber so that it can freely rotate around itself and form a regular ball during the operation of the machine. At the end of the operation the dough should not stick to the sides of the dough-moulding chamber when the lid of the chamber is raised.

7.9.

7.10.

8.

9. **Test report**

The test report should mention :

— dough handling properties at the end of mixing, and at moulding,
— the 'falling number' of the flour without addition of malt flour,
— any anomalies observed.

It should further include :

— the method used,
— all details required for the identification of the sample.

10. **General remarks**

10.1. The English version of ICC Standard No 115 is the authentic text. As the French and German versions are not in conformity with this text, they must not be used.

10.2. The formula for the calculation of the quantity of dough liquid is based on the following considerations :

Addition of x ml water to the equivalent of 300 g flour at 14 % moisture produces the required consistency. As in the baking test 1 kg of flour (14 % moisture basis) is used, whereas x is based on 300 g of flour, for the baking test x divided by three and multiplied by 10 g of water is needed, so 10x/3 g. The 430 g sugar-salt-ascorbic acid solution contains 15 g salt and 15 g sugar. This 430 g solution is included in the dough liquid. So to add 10x/3 g water to the dough, (10x/3 + 30) g dough liquid composed of the 430 g sugar-salt-ascorbic acid solution and an additional quantity of water must be added. Although part of the water added with the yeast suspension is absorbed by the yeast, this suspension also contains 'free' water. It is arbitrarily supposed that 90 g yeast suspension contains 60 g 'free' water. The quantity of the dough liquid must be corrected for this 60 g of 'free' water in the yeast suspension, so 10x/3 plus 30 minus 60 g must finally be added. This can be rearranged as follows :

$(10x/3 + 30) - 60 = 10x/3 - 30 = (x/3 - 3)\ 10 = (x - 9)\ 10/3$, the formula given in clause 7.5.

If, e.g., a water addition x in the farinograph test was found of 165 ml, this value must be substituted in this formula, so to the 430 g sugar-salt-ascorbic acid solution water must be added to a total mass of :

$(165 - 9)\ 10/3 = 156 \cdot 10/3 = 520$ g.

10.3. The method is not directly applicable to wheat. The procedure to be followed for characterizing the baking properties of wheat is as follows :

Clean the wheat, and determine the moisture content of the cleaned wheat. If the moisture content is within the range 15 to 16 %, do not temper the wheat. If the moisture content is outside this range, adjust the moisture content to 15·5 ± 0·5 %, at least three hours prior to milling.

Mill the wheat into flour using a Bühler laboratory mill MLU 202 or a Brabender Quadrumat Senior mill or similar equipment having the same characteristics.

Choose a milling procedure that yields a flour of minimum 72 % extraction, with an ash content of 0·50 to 0·60 % on dry matter basis. Determine the ash content of the flour according to the Annex to Regulation No 162/67/EEC of 23 June 1967, and the moisture content according to Annex II to Regulation (EEC) No 2731/75 of 29 October 1975. Calculate the extraction rate by the equation :

$$E = \frac{(100 - f)\ F}{(100 - w)\ W} \cdot 100\ \%$$

in which :

E = extraction rate ;

f = moisture content of the flour ;

w = moisture content of the wheat ;

F = mass of flour produced with moisture content 'f' ;

W = mass of wheat milled with moisture content 'w'.

Note : Information concerning the ingredients and equipment to be used is published in Document 77/300 of 31 March 1977 from the Instituut voor Graan, Meel en Brood TNO — Wageningen, Postbus 15, Wageningen (Nederland).