

NOTE ON A SIMPLIFIED RAPID METHOD FOR DETERMINING ALPHA-AMYLASE ACTIVITY¹

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Recently the author described a rapid method for determining the alpha-amylase activity of wheat and rye products (2). A simple modification of this method called the "falling-number" method is described in the present paper.

The apparatus described by Hagberg (2) is used except the electrical flash watch, which is not needed. Seven grams of flour or finely pulverized grain and 25 ml. distilled water (20°C.) are thoroughly shaken by hand in the precision test tube (21 by 220 mm.) using 20 vigorous shakes. The test tube with the stirrer-viscometer in position is immersed in the boiling-water bath and the stopwatch started. The surface of the suspension in the test tube should be about 5 cm. under the surface of the boiling water. Five seconds after immersion of the test tube, the suspension is stirred by moving the stirrer up and down at the rate of 2 times per second. The stirring is continued during 55 seconds and, after exactly 60 seconds from immersion of the tube in the bath, the stirrer-viscometer is allowed to drop by its own weight from its uppermost position. When the stirrer-viscometer has dropped a distance of 70 mm. the watch is stopped. The total time in seconds is the "falling number," which is a measure of the amylase activity.

The "falling number" will vary from 60 seconds or more for wheat and rye flours with high amylase activity (e.g., flour from

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sprout-damaged grain) up to 400 seconds or more for flour with low amylase activity.

The ratio of flour to water may be varied. Thus, for flours of low alpha-amylase activity, less than 7.0 g. may be employed. If flours of high alpha-amylase activity are commonly analyzed, the amount of flour may be standardized at a higher level than 7.0 g. per 25 ml. of water.

When the test is correctly performed, the values from two single tests do not deviate by more than $\pm 2.5\%$ of the mean value.

Discussion

The falling-number method gives reliable results over a wide range of alpha-amylase concentrations. The relationships between falling-numbers and alpha-amylase activities expressed as SKB units (1) for several wheat flours are shown in Fig. 1. This close relation-

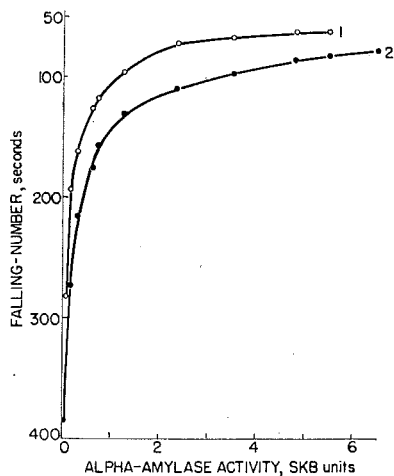


Fig. 1. Relation between falling number and alpha-amylase activity (SKB units) based on the values for several flours. Curve 1 was determined employing a concentration of 7 g. flour per 25 ml. water; curve 2 with 9 g. flour per 25 ml. water.

ship together with the precision and simplicity with which the falling-number can be determined render the procedure valuable where a simple, rapid, inexpensive, and sensitive method is required.

Literature Cited

1. AMERICAN ASSOCIATION OF CEREAL CHEMISTS. Cereal laboratory methods (6th ed.). The Association: St. Paul, Minnesota (1957).
2. HAGBERG, S. A rapid method for determining alpha-amylase activity. Cereal Chem. 37: 218-222 (1960).