THE WHEAT MEAL TEST FOR EVALUATING THE QUALITIES
OF SMALL SAMPLES OF WHEAT

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One of the greatest problems confronting the plant breeder is that of the time required to evaluate his creations adequately. Especially is this true in the case of wheat where several years must elapse before sufficient seed is available for making the standard milling and baking tests. A simple test of baking quality using only a small quantity of seed would permit the elimination of numerous lines in the early years of a breeding program.

The writers became interested in the simple test for small quantities of wheat as outlined by Pelshenke (5) and by Cutler and Worzella (1, 2). These investigators have followed the principles of the so-called Saunders' test (6). In this test the resistance of a fermenting dough ball in water to hydrolytic disintegration is considered to be positively correlated with baking strength. Instead of using flour as did Saunders, Cutler and Worzella ground whole wheat to a medium degree of fineness, while Pelshenke ground wheat in such a manner as to reduce the endosperm to essentially the fineness of flour.

EXPERIMENTAL METHODS

The methods outlined by Cutler and Worzella were followed closely. Single grindings on each of two mills were made for each sample. Triplicate dough ball tests were made on each ground sample. In the discussion of errors of the method, variability in grinding the samples is not included in the computed errors but is included in the portion of the variability due to varietal factors.

Preliminary tests showed definite differences between durum, winter, and spring wheats and further investigations were outlined to test the accuracy of the method for differentiating varieties within a class.

Thirty-nine varieties of hard red spring wheat and 17 varieties of hard red winter wheat of the 1931 crop were studied. The spring wheat samples were taken from a composite mixture of seed from rod rows grown at University Farm, Waseca, Morris, and Crookston, Minn. The winter wheat samples were mixtures of seed from rod row trials grown at University Farm and at Waseca.

Two types of mills were employed in the investigations. The Wiley mill, fitted with a 1-mm sieve, gave a relatively uniform product, but the use of this mill is time consuming, so in order to determine if a quicker grinding process could be used, portions of the same lots of wheat were ground on a power-driven Arcade burr mill. After passing the wheat through the burrs the chop was sifted by hand on a 1-mm sieve. The scalpings were reground, fines sifted out, and the