NOTE

Laboratory Dough Molder for Flat Breads

G. L. RUBENTHALER and H. A. FARIDI

ABSTRACT

Because a major factor influencing the quality of Middle-Eastern style flat breads baked is the thickness to which the dough is rolled in preparation for baking, a molder was designed and constructed to minimize this factor in laboratory testing. The molder is adjustable from 0 to 12 mm, in increments of 0.01 mm, and therefore is usable in preparing doughs for all flat breads.

Flat breads are very popular, especially in parts of the world where bread constitutes a major source of dietary protein and calories. Consumption and production of flat breads (including "pocket types") is rising in the U.S. and consequently this type of bread is a relatively new area of interest for researchers. At present, laboratory methods for evaluating flour quality for these breads are quite variable and poorly standardized.

Flat bread production procedures usually include mixing, fermenting, rounding, resting, molding (flattening and sheeting), proofing, and baking. One of the most crucial steps in flat bread production is the flattening and sheeting of the dough. The optimum dough thickness varies from 2 to 10 mm, depending upon the particular bread. Each type has a very small range of dough thickness that produces an optimum bread, and small variations change bread quality significantly. This is true in traditional bakeries (Dalby 1963, 1966; Faridi and Finney 1980) and automated systems (Schnee 1979), as well as in laboratory production (Eggum and Duggal 1977, Faridi et al 1981, Maleki and Daghiri 1967, Mousa et al 1979, Patel and Johnson 1975). The purpose of the present study was to design a laboratory molder to minimize problems associated with experimental baking of flat breads.

MATERIALS AND METHODS

Construction Details

A piece of aluminum 29.2 cm square \( \times \) 4.5 cm thick was turned down to a 29.2-cm diameter and then reamed out at a level 2.75 cm above the bottom to give an inside diameter of 25.5 cm. The top was reamed out to 24.2 cm in diameter (Fig. 1). The bottom portion of the open cylinder was then threaded to 10 mm/cm. A disk was formed by lamination a piece of Delrin\(^2\) 7 mm \( \times \) 25.5 cm in diameter with a piece of aluminum 1.25 cm \( \times \) 24.1 cm in diameter and a piece of maple 1.15 cm \( \times \) 24.1 cm in diameter. The Delrin disk was then similarly threaded (10 mm/cm) to fit the base ring. The maple was saturated with mineral oil for preservation as well as to prevent adhesion of the dough. A thumb screw was installed through the side of the base ring to hold the adjustable inner disk in a selected position. A ¼-in. PVC fusible belt was then fitted into a 3-mm groove in the bottom of the base ring to provide a cushion and nonskid surface. The aluminum ring was anodized to preserve the surface and to prevent the aluminum from discoloring the dough or the user's hands. An index on the bottom of the base ring and on the disk provides a reference for 1.00-mm increments; i.e., one revolution of the disk equals a 1.00-mm change up or down. The molder is adjustable from 0 to 12 mm at any fraction of a millimeter and is readable to 0.01 mm.

Application

The molder was designed for use with any 10–12-in. hard wood rolling pin. It was made circular to permit cross-rolling in any direction without first having to turn the dough. Dough can either be uniformly shaped or cut with any selected cutter up to 9 in. in diameter. A rolled dough and rolling pin are shown in Fig. 2.

White Arabic Bread

Bread for the study was made from 100% flour, 57% water, 1.5% NaCl, 1% baker's yeast, and 50 ppm ascorbic acid. Ingredients were mixed to optimum, fermented for 30 min at 30°C and 95% rh, sheeted at 2–7 mm dough thickness, proofed for 45 min at 30°C and 95% rh, and baked at 470°C for 1 min.

RESULTS AND DISCUSSION

Consistent dough thickness is essential for evaluation of the baking performance of flours in most flat breads, but particularly so in those breads that puff during baking (pocket type). Figure 3 illustrates the wide variation in bread characteristics (pocket

---

1Cooperative investigation by the Western Wheat Quality Laboratory, Western Region, Agricultural Research Service, U.S. Department of Agriculture, and the Department of Food Science and Technology, Washington State University, Pullman 99164.

2Scientific Paper 5932, College of Agriculture Research Center, Washington State University, Pullman.

3Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product by the USDA and does not imply its approval to the exclusion of other products that may also be suitable.

4Research food technologist in charge and visiting food scientist, respectively, Western Wheat Quality Laboratory, ARS-USDA, Pullman, WA 99164.

5Delrin is a Dupont trademark for acetal resin.

---

This article is in the public domain and not copyrightable. It may be freely reprinted with customary crediting of the source. The American Association of Cereal Chemists, Inc., 1982.
Fig. 3. Effects of rolled dough thickness on white Arabic bread development. Numbers indicate millimeters of dough thickness before baking.

Therefore, use of the molder may help in laboratory studies.

ACKNOWLEDGMENT

We wish to thank D & S Instruments, Pullman, WA 99163, for some design innovations and construction.

LITERATURE CITED


[Received June 15, 1981. Accepted August 14, 1981]