USE OF HYDROGEN PEROXIDE TREATED NONFAT DRY MILK IN THE CONTINUOUS DOUGH MIXING PROCESS

by 4589

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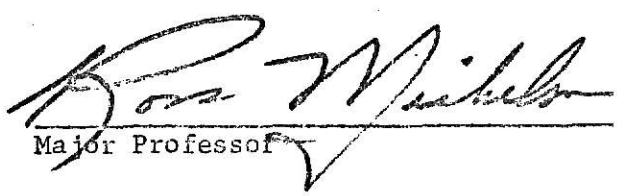

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INTRODUCTION

The baking industry is one of the major domestic, non-governmental buyers of nonfat dry milk. For several years, the baking industry has purchased more than one-fourth of the total production of nonfat dry milk available in the United States. A considerable portion of the nonfat dry milk used by the baking industry has gone into the production of white pan bread. Six percent nonfat dry milk, based on the flour weight, is commonly used in the bread formula made by the sponge dough method. From a nutritional standpoint, this is approximately equivalent to using liquid skim milk in the formula in place of water.

Skim milk, or the equivalent amount of nonfat dry milk, was originally added to bread to enhance its nutritional value. Several secondary benefits also were noted; namely, increased water absorption, greater mixing tolerance, improved shelf life, fermentation or oxidation stability, dough strengthening, a softer texture, more uniform grain, a creamy crumb color, and golden brown crust color (15, 36, 51). However, the initial use of skim milk did pose a serious problem with respect to loaf volume and dough softening. It was demonstrated in 1927 (14) that the loaf volume depressing factor could be destroyed by scalding the skim milk prior to its incorporation into bread dough. It was noted that the subsequent use of nonfat dry milk in bread also had a loaf volume depressing effect unless the milk had been sufficiently heated prior to drying. A considerable amount of research effort has gone into the study of the loaf volume depressing factor during the last three decades. It is generally accepted that the bakery grade nonfat dry milk must receive a minimum heat treatment of 80 C for 20 min (3).

In 1954, a continuous dough mixing process was developed to replace, in part, the conventional sponge dough process. Many problems were encountered when 6% nonfat dry milk was used in the formula with the continuous dough mixing process. It is reported that the use of more than 1% nonfat dry milk in the bread formula in the continuous dough mixing process resulted in a bread with decreased loaf volume, coarse grain, dull crumb, and harsh texture (8). Reports from industry also indicate that the power requirement for dough development increased significantly when 6% nonfat dry milk was used in a formula.