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Technical Paper

No. 6

BAKING PROBLEMS AND SOLUTIONS VOLUME 1

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Wrinkled and Collapsed Fruit Buns

The Problem

Fermented fruit buns collapsed very soon after leaving the oven and during cooling. Wrinkles appeared on the upper surface and sometimes the sides of the buns.

The Cause

The internal structure of the products has not made the 'foam to sponge conversion'.

The Explanation

During the baking process the gas cells in the dough inflate due to the production of carbon dioxide by the yeast and the thermal expansion of the gases. In the oven the wheat starch gelatinizes, and proteins coagulate as the heat penetrates from the product surface to its centre. Within the dough a temperature is usually reached during baking process when all of the gas cells change from being a 'foam' (where all the gas walls are separate and secrete from one another) to a 'sponge' where the cell walls have cracks/fissures in them which allow the gas they contain to diffuse throughout the structure. This is the moment when the product structure is 'set'.

In the fruit bun, a complete transition from foam to sponge may not have occurred. Consequently, as the product cools the pressure within any intact gas cells becomes less than the atmospheric pressure bearing down on the product. The bubbles 'shrink' as they cool (become smaller) and the product progressively collapses causing wrinkling of surface while the crust is still warm, this effect may be exaggerated as cooling continues. Dehydration (loss of water) during cooling will exacerbate the problem as the product crumb contracts pulling the crust downwards and inwards.

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The Solution

No amount of longer time or higher temperature baking will solve the problem. To avoid the problem, you should consider reduce the sugar level in the formulation (the higher sugar levels in fruit buns delay the gelatinization of the starch during baking) or reduce the ability of the dough to retain gas. The latter can be done by considering reductions in the 'strength' of improver or its levels of addition. A slightly lower protein flour may help limit this problem.

If you are reluctant to change the formulation or processing, then give a mechanical shock to the tray on which the product sits by banging the tray on the rack immediately it is removed from the oven. Such a shock causes the cell walls to fracture and the pressures to be equalized both inside and outside the product.

Similar problems may be seen with fruited breads though if these are baked in a pan the action of de-panning before cooling gives the required mechanical shock to limit the problem.