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The Experts' Forum

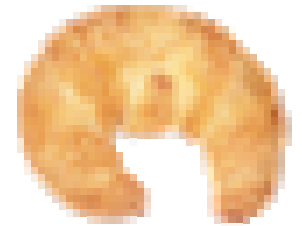


Feature Article:



Milk's Magic

by Lynda Sanderson



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by Lynda Sanderson (former Product Development Specialist with Guelph Food Technology Centre)

Question: Many baked products contain skim milk powder or other dairy ingredients. How are these ingredients beneficial when added to baked products?

Answer: There are many benefits to be gained from adding milk or milk ingredients to baked goods. Milk is used in both fresh and dried forms. Since fresh milk is perishable and requires refrigerated storage, it is a relatively high-cost ingredient. For this reason, most bakeries use dried milk ingredients in their baked products. Common dried milk ingredients used in bakery applications include powdered cream, powdered butter, whole milk powder, partly-skim milk powder, skim milk powder, buttermilk powder and lactose. The recommended amount of skim milk powder or equivalent for a fermented dough is two to eight per cent based on flour weight and up to 15 per cent in chemically leavened cake recipes.

Milk ingredients tend to increase the water absorption in fermented dough. As a result, doughs containing milk ingredients usually have a lighter, softer dough texture than those without added milk ingredients. They also retain a better shape and can be prepared more easily because they are less sticky and easier to form. They can be mixed more intensely, which has a positive effect on the maturing process. These doughs tend to have

higher fermentation stability (a higher capacity to retain gas), and higher fermentation tolerance (less sensitive to over- or under-development). The positive effect of milk ingredients on dough characteristics is due to improved properties of the gluten. Finely distributed milk fat makes the gluten smooth and slows down the fermentation process in the dough. This means the optimum proof time can be slightly exceeded without resulting in product deficiencies. The slowing of the fermentation rate with the presence of added milk ingredients is due to the resulting increase in dough pH. Due to the higher fermentation stability of doughs containing milk ingredients, the final proofing time can be extended. As a result, these doughs reach a larger dough volume during the final proof, resulting in larger volumes in baked loaves. Buttermilk and sour milk are exceptions to this rule because they have a lower pH than other milk ingredients and their use in a dough would result in shorter fermentation requirements than with other less acidic milk ingredients.

Milk ingredients impact the crust colour of bread and rolls due to lactose, the sugar present in milk and milk products. During baking the lactose reacts with amino acid browning agents to form brown pigments. As a result, products

containing milk ingredients will have a darker crust. Lactose has very little sweetness and is not a fermentable sugar. Therefore, sucrose (table sugar) must still be added to enable fermentation of the dough. In terms of other baked products, adding dried lactose can have many benefits. For piecrust, lactose provides good colour development in both the top and bottom crusts and yields a more tender and less soggy crust. For machine-dropped cookies, lactose may act as a release agent, enabling the dough to be released more easily from the die. In cakes and muffins, lactose provides body and increased volume with little influence on sweetness. Lactose can also bind flavours that are normally volatile and, hence, products with added lactose have more enhanced and intense flavour.

Added milk ingredients yield a tender crumb with fine cells and improved palatability (flavour and appearance) in baked products. This finer grain results in baked products that are easier and better to slice. Milk ingredients also keep the bread fresh for a longer period of time. This phenomenon of improved shelf life is mainly due to the fat content of milk ingredients and, thus, reduced shelf life benefits are noticed with milk ingredients that do not contain milk fat.

Adding milk ingredients to bakery formulations has a positive influence on nutritional composition. Milk provides all essential amino acids and contains minerals such as

calcium, magnesium and phosphorous. Also contained in milk are significant levels of vitamins A, B1 and B2.

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