



# Whey Permeate to Cut Sodium

By Sharon Gerdes  
Contributing Editor

**P**ermeate from milk or whey is quickly becoming a leading sodium replacement that provides functional and flavor benefits in foods, including baked goods. It contains mineral salts such as calcium phosphate, magnesium, sodium and potassium. These minerals provide permeate with a naturally salty flavor, which can be used to reduce or eliminate salt in a food formulation and help provide a more favorable nutritional label.


Milk or whey permeate is effective in products such as muffins, scones, breads, crackers, snacks, cookies and sweet goods. In baked products, permeate can offer many benefits, such as enhanced surface browning. Browning not only enhances appearance, but also adds pleasant caramelized flavors. Moisture retention and development of a tender crumb structure are also benefits of permeate inclusion in baked products. For example, cookies containing permeate tend to be crispier, have a shorter texture, and show better browning and spread. Pie crust can exhibit similar benefits. Permeate is also successful in low-fat or whole-grain cakes and quick breads, especially those with significant fiber levels.

Permeate can reduce ingredient costs while maintaining appropriate functionality in many applications. The addition of permeate will allow the replacement of other higher-cost, carbohydrate-based ingredients. In icings and coatings, permeate can reduce sweetness while providing important crystallization characteristics.

“During the development of a pound-cake formulation, the original goal was to find a lower-cost ingredient

that had added browning and flavor benefits,” says Kimberlee (K. J.) Burrington, dairy ingredients application coordinator, Wisconsin Center for Dairy Research, University of Wisconsin-Madison. “During the project, we discovered the salty characteristics of permeate and were able to drop the sodium level significantly—by 47%. A good point to begin using permeate to help reduce sodium is to start with an addition of 10 parts permeate to replace 1 part salt. In most applications, a 25% to 50% sodium reduction is achievable with the use of permeate.”

Other formulations saw similar sodium-reduction success. The sodium level of muffins dropped 70%, and whole-wheat pizza crust containing whey permeate saw a 97% drop in sodium levels.

Since 2000, researchers at the Wisconsin Center for Dairy Research have worked on several projects using permeate. Much of this work is supported by the Dairy Research Institute™. 

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