



Dairy Detective: Food Makers Turn To Whey Permeate

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Food manufacturers are always looking for a superstar ingredient - one with superb functionality that can help improve the bottom line. Whey permeate fits that bill nicely. It is a functional workhorse that can promote browning, enhance flavor, improve moisture retention and allow manufacturers to reduce sodium levels, all at a very reasonable cost.

Whey permeate ingredients vary in composition from supplier to supplier, but their typical composition is lactose (65-85%), ash/minerals (8-20%), protein (3-8%) and fat (1.5% maximum), according to the U.S. Dairy Export Council's "Reference Manual for U.S. Whey and Lactose Products."

Most of the protein consists of non-protein nitrogen compounds. Good solubility and pleasant dairy flavor make whey permeate formulator-friendly. Whey permeate is found in infant formula and other dry milk formulas, instant drinks, bakery products, confectionery bars, instant soups, milk drinks, sweetened condensed milk, ice cream and dessert products.

"U.S. production of sweet whey has decreased dramatically over the past 10 years because of increased filtration of sweet whey into higher-value concentrate for nutritional uses. This shift has resulted in more whey permeate powder production and limited suppliers of high-quality sweet whey powders. In addition, new facilities and equipment have been built and are manufacturing whey permeate that often functions as a 1:1 replacer for sweet whey in applications like compound coatings, biscuit and cracker manufacturing, culture media and meat sausages," says Peter Gutierrez, vice president, global ingredient sales, Agri-Mark, Onalaska, Wis.

From 2005-09, the U.S. production of permeate powder is estimated to have grown by an average of 17% a year, according to a report of various industry sources by 3A Business Consulting, Denmark. The same report projects that while production of lactose may slow, both volume and value of permeate ingredients will continue to grow over the next three years. There are no exact export figures because data for dry sweet whey and whey permeate often are combined in the same trade category.

Cost reduction also continues to be a major incentive to use whey permeate. Prices are always changing, but the 3A Business Consulting report noted that the cost of permeate powder was \$750 per metric ton,

as compared with \$900 per metric ton for whey powder, thus affording food manufacturers a substantial incentive to switch to permeate powder.

Food manufacturers that switch from sweet whey to whey permeate should first consult local regulations because acceptable uses of permeate may vary from country to country. In the United States, food manufacturers will have to change the ingredient declaration to “dairy product solids,” which is the common or usual name of the ingredient as specified in GRAS Notice No. 37. With more consumers looking for natural ingredients in their food products, this is a consumer-friendly label declaration.

Whey permeate as a sodium replacer

In 2000, the Wisconsin Center for Dairy Research (WCDR), Madison, began projects using whey permeate.

“Initially the focus was on browning, flavor enhancement and cost reduction, but we learned that whey permeate also has salt-enhancement characteristics,” says Kimberlee (KJ) Burrington, WCDR director of dairy ingredient applications. Much of the recent work at the WCDR has focused on sodium reduction in bakery products.

“While there is not an extensive amount of research on why whey permeate performs as a sodium replacer, it is believed that these non-protein nitrogen compounds - urea, creatine, creatinine, uric acid, orotic acid and ammonia - may serve as flavor potentiators. The mineral salts (calcium phosphate, magnesium, sodium and potassium) may function as salt enhancers,” says Burrington. Researchers were able to achieve sodium reductions of 12-70% in various bakery products.

Newer whey permeate ingredients also are appearing on the market.

“Delactose permeate has savory flavor characteristics, which can be used alone or in conjunction with other technologies to enable sodium reduction by as much as 30% in some product applications. Leprino Foods’ DLP is differentiated through a proprietary process where some of the lactose is removed, creating a more concentrated flavor that can be dried and ready for use in a variety of food applications,” says Deborah Roberts, category marketing manager, new business development and dairy ingredients of Leprino Foods, Denver.

An example of a creative use of whey permeate was demonstrated at the 2010 IFT Food Expo in Chicago. A portable breakfast bite made of cheese and eggs was formulated with roughly 2% permeate in the bread dough to provide 40% less sodium than similar cheesy on-the-go products. One study at North Carolina State University, Raleigh, N.C., by Elizabeth Dixon, also demonstrated how whey permeate could be used as a sodium replacer in cream soups, achieving sodium reductions of 25-50%.

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