

January 29, 2013

FOOD BUSINESS NEWS

NEWS, MARKETS AND ANALYSIS FOR THE FOOD PROCESSING INDUSTRY

www.foodbusinessnews.net

Stretching cheese further in formulations

Did you know Jan. 20 was National Cheese Lovers' Day? Yes, there is a day dedicated to the flavorful dairy product that, according to legend, was first made accidentally more than 4,000 years ago by an Arabian merchant who put his supply of milk into a pouch made from a sheep's stomach and traveled across the desert. The enzyme rennet, which was present in the lining of the pouch, combined with the sun's heat, causing the milk to coagulate, yielding what today is known as curds and whey.

Advance forward to 2013 where cheese makers have learned to manipulate the process and include other

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ingredients in order to produce the more than 1,400 natural cheese varieties cataloged in the World Cheese Exchange Database. These are the cheeses that were celebrated on Jan. 20, and contribute to the 33-plus lbs of cheese that the average American consumes annually.

That might sound like a lot, but it's less than the more than 50 lbs that the French consume per person each year. Further, compared to the French, who consume most of their cheese in its bare and natural form, Americans tend to be more creative.

Approximately 2.3 billion lbs, or 22% of the cheese produced in 2011, was used in commercial food processing, according to the Wisconsin Milk Marketing Board. This may be in the form of low-moisture part-skim natural mozzarella cheese shreds on a take-and-bake refrigerated pizza or low-melt pasteurized

process cheddar-style cheese sauce in frozen enchiladas. Forty per cent of the nearly 10.6 billion lbs of cheese produced in 2011 was sold as is through the retail channel, while 38% was used in food service.

Year after year, cheese is a

Ingredient innovations add
to the functionality of cheese

leading characterizing flavor in new product introduction, said Lu Ann Williams, head of research for Innova Market Insights, Duiven, The Netherlands.

"In the past decade we have seen the 'made with cheese' phenomenon evolve from common single cheese varieties such as cheddar and Swiss, to blends of cheese and the use of more ethnic cheeses," she said. "Interesting combinations include asiago with mozzarella and

Manchego with pepper jack. There's even a chai cheese about to be launched. A growing interest in all-things authentic is driving this desire for regional and specialty cheeses in all types of foods."

There's no doubt. Americans

love the flavors of cheese.

Research shows that approximately 95% of consumers prefer the taste of cheese and value it as an ingredient, the U.S. Dairy Export Council, Arlington, Va., said. The group noted modern cheese making technologies allow for cheeses tailored to meet specific compositions and application requirements, such as reduced-fat and lower-sodium.

Natural vs. pasteurized

Most natural cheeses, which are living systems that evolve

over time in terms of flavor and texture, are made from only four ingredients: cultures, enzymes, milk and salt. In Title 21 Part 133 of the Code of Federal Regulations (C.F.R.), the Food and Drug Administration defines cheese and outlines the requirements for more than 90 standardized cheeses, including natural varieties such as cheddar and mozzarella, as well as pasteurized cheeses such as cold-pack and process.

Though natural cheeses may be and are used in food processing, most formulators are relying on pasteurized cheeses, as the cheeses are not living systems. This enables better control over functionality.

Pasteurized cheeses start by blending a minimum amount of specified natural cheese with other ingredients, including those with emulsifying properties. The pasteurization step deactivates the enzymes and cultures, which stops



the ability to control functionality, most cheeses used in food processing tend to be pasteurized.

Label declaration issues

Formulators must remember that cheese type must be clearly labeled on the ingredient statement. If specific cheese use is declared on product labels, that cheese must legally comply with the standards, if one exists. For example, if a frozen pizza is made with Parmesan cheese, it must contain legally standardized Parmesan cheese. On the other hand, if a pizza variety is described as being made with “real cheese,” that pizza may include imitation cheese as well as any standardized cheese. In other words, the formulator may choose to reduce cost by

blending real cheese with less expensive imitation cheese.

Real cheese is any standardized cheese, natural or pasteurized. However, to say a pizza is made with real mozzarella cheese, the cheese must be made with standardized mozzarella cheese. To say a pizza is made with real cheese, the cheese may be a process version of mozzarella or even a modified version of mozzarella, which is allowed when variables such as fat or sodium are reduced, per the Nutrition Labeling and Education Act. The N.L.E.A. states that standardized foods that have been modified may contain ingredients that assist in making that product nutritionally and functionally similar to the original product. However, the addition of such ingredients must be stated.

Most food processors opt for using some or all real cheese in order to add value

the cheese from changing.

As mentioned, the C.F.R. provides standards for a number of pasteurized cheeses, but there are also many cheeses that are non-standardized, allowing for additional

ingredients and process modifications to meet finished product specifications. This includes functional properties such as restricted melt, enhanced flavor and controlled browning. Because of



to the product, giving it a more natural or premium positioning for today's label-scrutinizing consumer. Cheese ingredient options vary by the application and shelf life. Sometimes one form may be used alone, as the sole characterizing cheese flavor in a food application, while other times multiple forms will be used for enhanced sensory appeal and/or cost savings.

"Bulk-packed, pasteurized process cheese is often part of the cheese component in packaged, heat-and-eat foods, as these cheeses can be designed to not run off or out of the product, nor change in terms of texture or taste when heated," said Chad Mitchell, technical manager of flavors for DairiConcepts L.P., Springfield, Mo. "We also offer heat-setting cheese sauces that help stabilize the gel or matrix of fillings in commercially prepared foods so that when the finished product is heated, the cheese filling remains intact without oozing out of the product.

"The heat-setting cheese sauces work best combined with pasteurized process cheese in ratios ranging from 40-to-60 to 60-to-40. These sauces have the additional feature of thickening and setting to a process cheese-like consistency when subjected to a high-temperature cooking process, such as deep-frying."

Market conditions to consider

When economics and extreme functionality

become a product development priority, there are a number of options, some of which still allow for a "made with real cheese" claim.

"We offer cheese bases that are blends of functional dairy and non-dairy ingredients," Mr. Mitchell said. "They can be conveniently incorporated into cheese sauces and dips as partial or complete replacement for typical cheddar cheese solids, offering an economical advantage to the manufacturer. They also do not require grinding or extra processing and can provide superior functionality when compared to natural cheddar cheese."

Becky Pogoreski, product development manager for SensoryEffects, Bridgeton, Mo., describes another ingredient option that allows for the flavor of cheese to be added to some otherwise unlikely applications.

"We offer lipid-based flakes and nuggets that mimic the appearance, flavor and performance of real cheese," she said. "Some inclusions can be formulated to contain real cheese, while others can be designed to be kosher pareve or kosher dairy. This opens up our inclusions to customers that are restricted by kosher requirements."

The inclusions are intended for bakery or heated applications and require at least a temperature of 125°F to function properly.

"We recommend that they be added as late in the mixing process as possible, to the dough or mix, in order to avoid



excessive heat and friction,” Ms. Pogoreski said. “Some innovative uses include meats, such as sausage links and

patties, hot dogs and pigs-in-a-blanket type products. The inclusions come in a variety of sizes in order to optimize

processing and performance.”

The lipid-based matrix protects the ingredient, giving the inclusions a lengthy shelf life.

“Their 15-month shelf life provides food manufacturers with consistent availability and stability in pricing,” she said.

In addition to most traditional and ethnic staple cheese flavors, the inclusions also may come flavored with other ingredients, such as spinach asiago and garlic cheddar.

QualiTech Co., Chaska, Minn., markets what it refers to as cheese “flavorettes.”

“They don’t melt, burn or blacken and they provide a better nutritional profile than real cheese, in terms of sodium and fat content,” said Rudy Roesken, general manager and corporate vice-president of food ingredients. “They deliver rich cheese flavor into systems where real dairy products don’t work very well.

“The concept of the cheese flavorette came to fruition when a customer requested a cheese-based ingredient that would not melt while baking and could also be used in a frying process,” Mr. Roesken said. “So we created an encapsulating matrix that protects cheese powder, allowing it to be used, for example, topically on a bagel. Real cheese would melt, cause burn specks or otherwise become indistinguishable in the product it was added to.”

In conclusion, the Dairy Export Council said that depending on the cheese ingredient, when added to a food formulation, the cheese may improve its nutrition profile. FBN

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