Building Better Foods and Supplements

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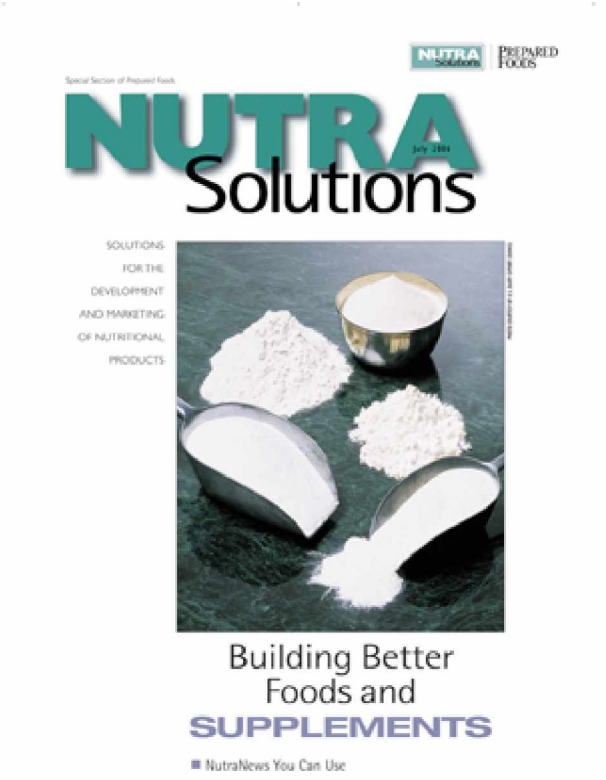
Posted: July 1, 2006

Whey proteins, whether isolates, concentrates or in a hydrolyzed form, long have been used in products to benefit consumers looking for enhanced sports performance.



For example, whey proteins are "first up to bat" on the ingredient list of both Iovate Health Sciences U.S.A.'s Muscletech Meso-Tech Complete Cinnamon Oat Bar and Allmax Nutrition's Isoflex dietary supplement. Masterfoods USA Snickers Marathon Protein Performance bar also sports whey proteins high on its ingredient legend. Increasingly, researchers, manufacturers and consumers alike are delving into other benefits that dairy-derived proteins may provide.

Survey Says...

"Family health and nutrition concerns are increasingly influencing household food purchases in the U.S.," notes a recent study by the Food Marketing Institute and Prevention magazine. The study, "Shopping for Health 2005: Meeting the Needs of Family Health and Wellness," was based on telephone surveys of 1,000 adults across the U.S. The results showed over 60% of those surveyed think their diets could be healthier. Some 42% wanted a healthier diet in order to lose weight, 39% to prevent health problems later in life and 28% said a healthier diet would help them manage an existing medical condition.

The trend toward using products to control specific health concerns is found in dietary supplements as well. Using its Health & Wellness Trends Database, the Natural Marketing Institute (NMI) reports that in 2005, 49% of the over 2,000 adult consumers in an online survey said they used "condition-specific

support, 18% for energy and 15% for digestion support.

And the trend may be increasing. Some 21% of 2,000 Baby Boomers (41 to 60 years old) surveyed by NMI for its Healthy Aging/Boomer Database indicated they had increased their use of such supplements in the past year.

Consumer interest in health is translating to how dollars are spent. Information Resources Inc. (IRI) reports that, in a ranking (based on food, drug and mass-merchandiser dollar sales) of all new food/beverage brands launched in the past two years, seven of the top 10 2004 launches and five of the top 10 2005 launches offered a reduced-calorie benefit.

“The biggest trends result from a convergence of multiple factors,” says Valerie Walker, vice president, Consumer & Shopper Insights, IRI. “Americans are changing their eating habits for many reasons: to help children avoid weight problems, to improve personal appearance, to deal with a current medical condition like diabetes or high blood pressure, to feel good today, or to reduce their chances of developing future health problems like cancer and heart disease. Manufacturers are responding to these needs with great-tasting products with major reductions in “bad” features like trans fats and calories, and significant additions of “good” features like antioxidants and whole grains.

Which additions to use and how they actually benefit consumers, however, continue to be discussed. Indeed, biological activity, bioactives and nutraceuticals are terms featured in practically every food trade publication.

Nearly all foods offer bioactive properties. One challenge to understanding a food’s benefits lies in the concept that the food does not contain a health-promoting property for any reason relating to the consumer. Rather, the food exists as a survival mechanism for the organism itself. For example, corn kernels and wheat grains exist as part of those plants’ reproductive cycles.

Milk, however, has the singular purpose of delivering nutrition to mammal offspring. Its every component—protein, fat, carbohydrate and mineral—has a role in this mission. As Nobel laureate A.L. Virtanen said in 1954, “Milk has a special position among other foodstuffs, since it has the most versatile composition. As abundant a use as possible is economically advantageous from the viewpoints of both an individual and of whole nations.”

The wealth of biological activity associated with dairy ingredients is extensive. Calcium is frequently touted for its benefits. It has a role in bone health; as a potential antihypertensive agent, calcium plays an important role in weight management and may reduce the risk of certain cancers. Beyond calcium, however, ingredients hold their own in terms of healthfulness and the value they bring to functional food and dietary supplement formulations.

Whey Stakes its Claim

Whey proteins, one of the richest sources of bioactive materials, are promoted for their potential health properties beyond enhancing physical performance. These benefits include boosting the immune system, promoting cardiovascular health and providing a quality protein source for those suffering from lactose or gluten sensitivity (to name a few). Whey proteins are used in many health product applications such as meal replacements, breakfast bars and various health snacks, beverages such as smoothies, baby foods and others.

Including both health and non-health oriented products, Mintel International's Global New Products Database (GNPD) has tracked some 2,188 new product launches in the U.S. and Canada containing whey protein concentrates since January 2000. Many manufacturers see a bright future for these ingredients as well. The 2005 Prepared Foods' "R&D Trends Survey: Functional Foods and Beverages," with 441 respondents, asked, "During the next two years, do you expect the following ingredients to become more or less important in your functional foods formulation efforts?" Some 31% of the respondents with R&D and/or marketing responsibilities checked off "whey protein." This ranked the ingredient behind such notables as dietary fiber, organic ingredients and omega-3s, but ahead of vitamin E, minerals (in general) and isoflavones.

In 2003, the U.S. Whey Research Consortium was formed to increase global usage of whey proteins by developing and documenting health and wellness benefits, including pursuit of an FDA-approved structure-function claim that can be used in marketing products. At the April 2006 Experimental Biology meeting in San Francisco, USDA researcher David Bauer presented a clinical trial abstract supported by the Consortium that found individuals consuming supplemental whey protein for six months weighed less and had less body fat compared to individuals who consumed a carbohydrate supplement.1

Some consumers already make a link between "dairy" and "weight control." In a 2006 survey entitled "Focus on Milk: Exploring Consumer Attitudes & Behaviors," by BuzzBack Market Research, of the 883 milk-drinking consumers who responded to the question "…which of the following are reasons why you drink milk?" 18% of women and 9% of men responded, "To help me lose weight."

Any ingredient assisting in weight management will be popular among manufacturers. Prepared Foods' 2005 survey asked respondents, "What ingredient characteristics or benefits present the greatest opportunity for your product development efforts?" Weight loss was at the top of the list, with some 49% selecting this characteristic. Other characteristics considered important included "energy" checked off by 36%, "digestive health" by 35%

and “immunity enhancement” by 24%. Can dairy proteins play a role in these areas?

Researching Riches

Whey’s many individual biological components, including lactoferrin, beta-lactoglobulin, alpha-lactalbumin, glycomacropeptides and immunoglobulins, are being recognized for their health-promoting properties. Immune enhancement is one area of great potential.2 Lactoferrin has been found to modulate the microbial intestinal environment of newborns as well as act as an anti-microbial agent against a variety of pathogens and as a prebiotic.3 Dental hygiene products have been patented using casein phosphopeptides and glycomacropeptides to inhibit growth of the bacteria that causes dental caries.4

In a review of the scientific literature addressing bioactive milk peptides and their potential as commercial products, D.A. Clare and H.E. Swaisgood of North Carolina State University cite the use of phosphopeptides from casein fractions in dietary and pharmaceutical supplements and the possibility of tapping the antimicrobial properties of components like lactoferrin and glycomacropeptides as preservatives to promote consumer safety.5

Current research alludes to the inherent preventative and therapeutic properties of these milk components—a veritable bonanza for food scientists in the U.S. and abroad. A recently published article in an online Polish medical journal addressed research into the use of proteins and peptides from colostrum and milk in prevention and therapy, specifically lactoferrin (antibacterial, antifungal, antiparasitic, antitumoral), glycomacropeptides (antibacterial, antithrombotic) and alpha-lactalbumin (antiviral, antitumoral, anti-stress), among others.6

Beyond whey components, it is difficult to have a discussion about healthful dairy ingredients without addressing milk fat, a complex fat source with great potential, despite its past reputation. According to Rafael Jiménez-Flores, professor of dairy science at Cal Poly’s Dairy Product Technology Center, the milk fat components with the most marketability in the near future are phospholipids, gangliosides and lipoproteins—all associated with the milk fat globule membrane (MFGM). Animal research suggests that components of MFMG play a role in preventing intestinal cancer, and V.L. Spitsberg did a recent review in the Journal of Dairy Science on the bovine MFGM as a potential nutraceutical.7

While it takes time, products featuring many of these beneficial ingredients are finding their way to market. Biologically active food components can be protein, mineral, lipid, carbohydrate, etc. It all relates back to the genome

that caused its synthesis or the genome of the consumer as it responds to the presence of the bioactive component. The science surrounding an understanding of the biological basis of each individual and its relationship to all the elements of its environment continues to march forward at an ever-quickening pace.

To understand bioactives, it is best to go to the model nature devised to deliver bioactives: milk. Researchers from around the world are working on this concept. Helping in this scientific pursuit is the mapping of the human genome and especially those human genes responsible for milk production. While we will never market human milk, the understanding of how humans deliver bioactives to their babies will eventually guide product development of commercial cow's milk. Such knowledge may benefit the development of other food commodities as well. The world will learn how to best deliver bioactives through food products, and food formulation will never be the same.

The International Milk Genomics Consortium (IMGC) represents a forum for this discussion and supports an Internet-based data management system where members upload and download. (See the "Understanding Milk" sidebar.) Once we understand how milk delivers biological activity, we can extrapolate the concepts to any other food and modify those foods, dairy or otherwise, to deliver the specific biological activity optimally. This is a food formulator's dream, and the consumer benefits all the way. The food industry can build better foods; they have the ingredients. NS

Sidebar: Utilizing Lactoferrin

Lactoferrin use in infant products is common in many Far Eastern countries. At the start of 2006, PepsiCo's Quaker Foods & Beverages introduced Hydrolyzed Protein Formula Growing-Up Milk Powder 3 in Taiwan. It is composed of hydrolyzed alpha-lactalbumin (i.e., hydrolyzed whey protein) with added vitamins, oligosaccharide, iron, docosahexaenoic acid (DHA) and lactoferrin. The product claims it can be "easily digested, and is suitable for one- to three-year-old babies." Also in Taiwan, Jia Ru Food, under the Yoplait brand, introduced a lactoferrin-containing yogurt drink that claims to "help iron digestion for children, and help adults keep healthy." Its ingredient legend reads: "Raw milk, skimmed milk powder, active lactobacteria, lactoferrin." In Japan, Morinaga Milk Industry launched a yogurt with 200mg of lactoferrin, "a multi-functional protein from milk found in breast milk."
Source: Mintel's Global New Products Database, www.gnpd.com/Ph: 312-932-0400

Sidebar: Understanding Milk

The International Milk Genomics Consortium (IMGC) is a corporate/academic partnership established in 2004 to provide a collaborative and interactive research environment to accelerate the understanding of the biological processes underlying the genomics of mammalian milk and using that knowledge to improve health. Information about the IMGC is available online at www.imgconsortium.org and during the 3rd International Symposium on Milk Genomics & Human Health, which will be held September 19-21, 2006, in Brussels, Belgium. Visit http://milkgenomics.fil-idf-pr.com/ or contact Jennifer Giambroni at info@imgconsortium.org.

On the Web: DAIRY-BASED NUTRACEUTICALS

* www.nationaldairycouncil.org — National Dairy Council
* www.wheyoflife.org — Whey Protein Institute
* www.HealthyWhey.org — California Dairy Research Foundation site on whey
* www.dairyline.com/releases/040706cdrf.htm — Abstract on whey protein and body composition study
* www.usprobiotics.org — California Dairy Research Foundation site on bioactives and probiotics