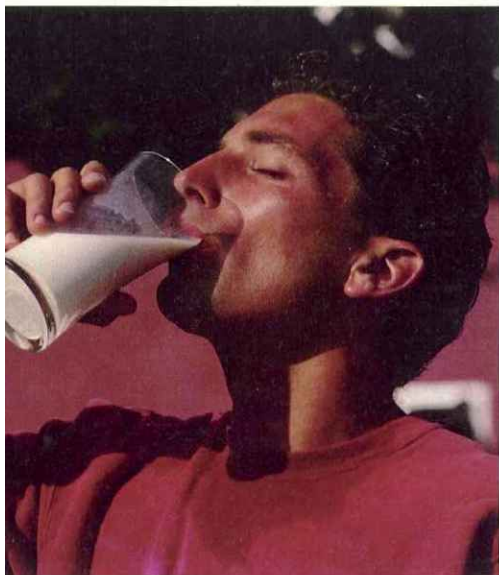


High-value Whey Fractions Offer New Opportunities



Sharon Gerdes



Whey protein is an excellent source of essential amino acids. Fractionated into its individual components, whey provides numerous concentrated functional and bioactive ingredients. Current commercial interest focuses on alpha-lactalbumin, glycomacropeptide, immunoglobulins and lactoferrin as well as some phospholipid and milk mineral fractions. As the body of evidence grows documenting the health and functional benefits of whey, fractionating whey holds the promise of new growth for dairy processors. Let's explore both existing and emerging benefits of the current commercial fractions.

Alpha-lactalbumin (ALA) is used primarily for its nutritional value in nutraceutical and pharmaceutical applications. ALA is used in infant formula to make it more like human milk. ALA is also rich in tryptophan, a precursor of serotonin. This important neurotransmitter is thought to play a role in the regulation of the sleep-wake rhythm, the response to stress, and other physiological processes.

Beta-lactoglobulin (BLG), which accounts for 50% - 60 % of total whey protein, is a true functional workhorse. With superior whipping, gelling and fat-replacement properties, it works well in bakery, meat, sauce and beverage applications.

Glycomacropeptide (GMP) research has addressed the ability of GMP to bind specific toxins, inhibit bacterial and viral adhesions, and modulate immune system responses. Also, a group of researchers based at the Wisconsin Center for Dairy Research (CDR) at the University of Wisconsin-Madison, has been studying the feasibility of developing foods with GMP for individuals born with PKU, who cannot metabolize the amino acid phenylalanine. This significantly restricts the amount and type of dietary protein they can consume. GMP is a potential effective dietary protein source in these individuals because it does not contain this amino acid.

Immunoglobulins can be isolated from both bovine colostrum and whey. Bovine whey contains three major classes of Immunoglobulins: IgG, IgM and IgA. Research continues to investigate the role of whey in reducing the effects of HIV infection.

Lactoferrin is used extensively in the international marketplace, both in infant formulas and in supplements to boost the immune system. Matt McKnight, vice president, export ingredient marketing and industry affairs, U.S. Dairy Export Council, Arlington, Va., notes, "As more consumers take an active role in improving their health, increasingly they are expecting food and beverage products to provide potential health benefits. Lactoferrin is a natural fit for these consumers."

Milk mineral complex, with its combination of calcium, phosphorus, magnesium and zinc, offers a superior supplement for bone health, according to Eric Bastian, Ph.D., director, research and development, Glanbia Nutritionals,

Twin Falls, Idaho. Bastian notes that this ingredient, long popular in overseas markets, has seen increased use in the United States. With its bland flavor, it works well in both tablets and food and beverage applications including breads and juices. In yogurt, milk mineral complex adds a sheen to the product.

Whey phospholipid fractions offer both nutritional and functional benefits. Whey phospholipids are excellent emulsifiers, according to Dan LaMarche, vice president, whey operations, Trega Foods, Little Chute, Wis. Bastian notes that preliminary research on the phosphatidylserine component in whey phospholipids shows it can reduce cortisol, a stress hormone.

Supplies of whey fractions continue to increase. Recently, Hilmar Ingredients, Hilmar, Calif., introduced an ALA-enriched whey ingredient. Leprino Foods Company, Denver, Colo., already produces ALA and BLG and is evaluating GMP for future production.

Most current processes for separating whey fractions are batch processes, according to Kasiviswanathan Muthukumarappan, Ph.D., professor, Agricultural and Biosystems Engineering Department, South Dakota State University, Brookings. Along with his associate, Marella Chenchaiah, he has been working on a continuous process to fractionate ALA and BLG. Currently the team is able to produce ingredients with ALA purity of 60%, compared to 22% in the whey base they use, but they are making modifications to increase the level of purity. They hope to have this technology ready to share with dairy processors by mid-2009. ■

A complete list of suppliers of whey fractions and more information on whey ingredients may be found at www.innovatewithdairy.com. Technical Support Consultant Sharon Gerdes can be reached at 800/248-8829.