

ADSA-SAD Dairy Foods Undergraduate Competition

139 Milk fats in the American diet. R. Pomeroy*, *North Carolina State University, Raleigh.*

The USDA-FNS [United States Department of Agriculture - Food and Nutrition Services] has recently proposed a rule to revise the Nutrition Standards in the National School Lunch and School Breakfast Programs, this revision is based on the 2005 USDA - HHS [Health and Human Services] Dietary Guidelines for Americans, and consistent with the recently released 2010 edition. One of the rulings requires schools to include either fat-free or 1% milk instead of the variety of milk fats offered currently as part of reimbursable meals. Compiled information from many scientific reviews, USDA abstracts and primary sources examine the potential health benefits of milk fats and the health concerns of whole milk. The USDA suggests 3 servings of fat-free or low fat dairy products per day; this suggestion is consistent with the objective to decrease obesity and blood cholesterol levels in Americans, which could contribute to cardiovascular disease. The opposing concern on this issue relates to the potential health benefits of milk fats; such as anti-carcinogen effects and the availability of good unsaturated fatty acids. There are many differing opinions for the nation's health at large, and the implications of this research shows that while some individuals may benefit from the extra energy provided from the fats in whole milk, most Americans do not need these extra calories in their daily food pattern.

Key words: skim milk, whole milk, milk

140 Fortification of omega-3 milk. K. C. Smith*, D. R. Winston, B. A. Corl, and K. M. Waterman, *Virginia Polytechnic Institute and State University, Blacksburg.*

Omega-3 fatty acids (n3) are polyunsaturated fatty acids essential to the human diet. Omega-3 fatty acids have been proven to play major roles in various functions of the body, such as brain development, prevention of cardiovascular disease, Alzheimer's disease and depression. Examples of n3 fatty acids include docosahexaenoic acid (DHA), docosapentaenoic acid (DPA), eicosapentaenoic acid (EPA), eicosatetraenoic acid (ETA) and stearidonic acid (SDA). Adequate intakes of n3 fatty acids (g/d) for adults consuming a 2000 kilocalorie diet are 6.67 for α -linolenic acid and approximately 0.22 for both DHA and EPA. These n3 fatty acids cannot be made by consuming α -linolenic acid, an essential fatty acid only synthesized by plants. Very long chain n3 fatty acids are also obtained from fish including tuna or salmon. Milk can be fortified with n3 fatty acids by fortifying at the plant or by supplementing the cow's diet. However, both these processes have complications. Marine oil additions to processed milk often add an off-flavor and smell, and consumers tend to shy away from a product that is not sensually stimulating. Marine oils or genetically modified soybeans supplemented into the diet of the dairy cow can supply n3 fatty acids, but rumen microbes tend to biohydrogenate unprotected polyunsaturated fatty acids, resulting in absorption of saturated fatty acids. Long chain n3 fatty acids also have poor transfer into milk fat reducing total absorption into milk. Fortifying milk with n3 fatty acids may not be as beneficial as enriching other agricultural commodities such as eggs or chicken because of off flavors, expense of rumen-protected feeds, and lack of transfer efficiency into milk.

Key words: omega-3, fortification

141 The promise of bovine lactoferrin for breast cancer prevention. E. Schaffel* and J. Fain, *Clemson University, Clemson, SC.*

Studies have shown the numerous benefits of milk and other dairy products on human health. In particular, bovine lactoferrin (bLF), an iron-binding whey protein, has been discovered to act as an antiviral, antifungal, anti-inflammatory, antioxidant, and antiparasite agent. In addition to milk, lactoferrin can be found in other tissues or secretions, such as tears, saliva, and blood. In the past several years, researchers have encountered the protein's ability to inhibit the growth of certain tumors and metastasis. Cancer is a result of several alterations in normal cells: the ability to be self sufficient in growth signals; to avoid antigrowth signs and apoptosis; to obtain an endless ability to replicate; to maintain angiogenesis; to evade tissues; and to form metastases. In one research trial, rodents receiving oral administration of bovine lactoferrin experienced significantly reduced tumorigenesis in varying organs (esophagus, tongue, lung, liver, colon, and bladder). This shows promise for future human health benefits as last year, over one million people were diagnosed with breast cancer and 460,000 people died of breast cancer worldwide, making it the second leading cause of cancer death in women and on the top 10 causes of death in high income countries worldwide. In a recent study, lactoferrin's tumor suppressing properties were observed on 2 types of human breast cancer cells: HS578T and T47D, the more aggressive form being the HS578T cells. The cells were either treated or untreated for varying periods of time with differing lactoferrin concentrations, which ranged from 0.125 μ M to 125 μ M. Researchers studied cell viability, apoptosis, migration, and proliferation. Although the specific results from each of these areas differed and the exact mechanisms are not completely understood, overall results highlight the whey protein's disruptive effects on vital steps in cancer development. Increasing research on the benefits of bovine biologically active food components have helped scientists better predict preventative methods to inhibit the spread of chronic diseases and show promises for combating the breast cancer epidemic.

Key words: bovine lactoferrin, breast cancer, prevention

142 Market research to boost dairy product demand. A. N. Waldeck*, *University of Kentucky, Lexington.*

Market research can provide dairy processors with knowledge to boost dairy product sales. Asking consumers about new products, improved products, and product positioning helps to generate more dairy industry revenue. Over the past 25 years, total dairy product consumption has increased while fluid milk consumption has decreased. The dairy checkoff program creates new partnerships to increase dairy product demand. The dairy industry has partnered with other corporations to boost sales through mutually beneficial marketing arrangements. Starbucks, Yoplait, and McDonald's all have incorporated dairy processing technology to ensure that dairy products remain a prominent ingredient in each of these company's product lines. The dairy industry has also partnered with Domino's and McDonald's to increase cheese consumption. For example, 2 slices of cheese are included on each McDonald's Angus Third Pounder. This item was only supposed to be on the menu for a limited time, but the product was popular enough that it is now on the menu permanently. An estimated 532 million pounds of milk is used annually for this product alone. Pizza companies purchase 25 percent of the cheese produced in the United States (DMI 2009 Annual Report). Domino's was the first pizza chain to add

extra cheese to their pizzas. As other pizza chains have observed the increase in sales resulting from this change, the number of chains offering and promoting extra cheese on the menu has increased. Market research also allows dairy processors, such as Dean Foods, to generate valuable information about targeted market segments. This information can be used to refine and focus advertising, promotion, and new product launches to these targeted populations to increase revenues. This research may also be helpful in communicating human nutrition benefits of dairy products. Market research is a multi-step process that requires considerable planning to ensure that effective information is collected and used. Market research has and will continue to contribute to dairy product consumption through product innovations, corporate collaborations, and marketing campaigns.

Key words: market research, dairy product demand, consumer

143 Dairy super foods: Antioxidants could make the difference. S. B. Weimer* and D. R. Olver, *Pennsylvania State University, University Park.*

Antioxidants are substances that reduce oxidative damage caused by free radicals, which are highly reactive molecules or atoms that attack and modify the chemical structure of cells. Because of the damages they prevent, antioxidants have been linked to fighting cancer, heart disease, and even aging. Foods naturally rich in antioxidants and those fortified with antioxidants are becoming more popular. Dairy foods are entering the antioxidant race. Fortifying dairy products such as yogurt with antioxidants has the potential to bolster sales by providing an even more appealing value-added product. Foods such as yogurt may be excellent carriers for antioxidant extracts because dairy products have the ability to mask the bitter taste of certain antioxidants. In a Uruguayan study (Ares et al., 2009), researchers compared sucrose, sucralose, polydextrose, and milk for their abilities to reduce the bitterness, astringency, and characteristic flavors of antioxidant extracts from 2 native plants. The study found that each reduced the strong flavors of the antioxidants, but that effectiveness was dependent on the

type and concentration of the antioxidant extract being considered. For one of the plant extracts, milk was most effective at masking bitterness and astringency; however, for the other plant extract, sucrose was the best inhibitor of strong flavors. As a result, the study concluded that “sweetened dairy products could be interesting carriers for the development of functional foods containing polyphenolic-rich antioxidant extracts.” Development of antioxidant enhanced food products is rapidly increasing. Mintel, a market research company, reported an increase of 1,616 products in the antioxidant-enhanced food and beverage category between 2005 and 2009. Companies from across the world and in the United States are beginning to offer dairy products with added antioxidant benefits.

Key words: antioxidants, dairy product innovation

144 What you don't know can hurt you: Unlocking the secrets of milk. T. Hippman*, *Louisiana State University, Baton Rouge.*

Milk and milk products are an excellent source of vitamins and minerals. Vitamins in milk include vitamin A, thiamin, riboflavin, niacin, and vitamin B6. Minerals contained in milk include calcium, phosphorus, potassium, copper, iron, and zinc. A lack of these in the diet can cause a variety of problems such as paralysis, osteoporosis, hypertension, blindness, skin problems, irritability, and fatigue. Milk is an ideal source of these vitamins and minerals, not only because it is rich in them, but also because it contains them in the proper ratios to facilitate absorption. Of these vitamins and minerals, research has shown calcium and vitamin D to be extremely important in the diet. Research shows that vitamin D deficiency and rickets are re-emerging as health problems in infants and children. Therefore it is extremely important to maintain a healthy intake of milk and milk products on a daily basis to reduce the risk of a vitamin or mineral deficiency and thus the potential occurrence of disease.

Key words: vitamins, minerals, milk