

ADSA-SAD (Student Affiliate Division) Undergraduate Competition: Dairy Foods

196 Organic versus conventional milk production systems.

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In the past decade, organic farming has increased in popularity. Many consumers who support organic farming believe that organic products differ in composition from conventionally produced products. Additionally, organic milk supporters often believe that organic dairy farming is more beneficial to cows and the environment. The milk is produced without antibiotics, added hormones, synthetic chemical treatment or genetic modification. This leads many consumers to believe that organic milk has potential human health benefits. Milk composition is affected by many factors. Studies comparing organic vs. conventional milk are sparse. A recent *Journal of Dairy Science* review covers the individual factors that affect milk composition and provides an overview of a few studies that compare organic and conventional milk. Factors influencing milk composition, such as nutrition, breed, and stage of lactation, have been studied individually, but are difficult to compare simultaneously. Some studies have shown that organic milk has higher levels of omega-3 fatty acids and conjugated linoleic acid, but it is unclear as to whether these differences are truly beneficial. Milk fatty acids are often researched when considering organic vs. conventional milking systems because fatty acids respond rapidly and are very sensitive to changes in the diet of cattle. Studies also discuss the use of antibiotics, the presence of hormones, and genetic modification factors that many organic consumers base their purchases on. More research needs to be conducted to determine whether one production system is more beneficial to human health than the other. Organic consumers pay a higher market price for their products, and as of now, no proven benefits for purchasing organic milk have been demonstrated. No major health differences between organic and conventional dairy products have been proven.

Key Words: organic milk production, conventional milk production, milk composition

197 Postmortem factors relevant to veal quality. Sloane Garcia* and Chad Carr, *University of Florida, Gainesville, FL.*

Veal represents a relatively minor percentage of the meat industry as a whole. During the past half century the veal industry has undergone considerable changes in production practices. Currently, grain-fed and heavier calves are the norm and many farms are converting to individual pens as opposed to group housing which, in addition to improving the conditions for the animals, has also improved the public's perception of the industry. (1) It is generally accepted that meat quality is the most important indicator of financial returns on the product. In today's world, the industry places strong emphasis on lean color in spite of the absence of scientific evidence validating a direct effect on quality. (2) This presentation will discuss the effects of post-mortem factors on veal quality. Factors associated with meat quality include carcass grade, aging, and packaging. According to the USDA, milk fed calves produced carcasses that were lighter in lean color and fatter, however these graded scores do not directly correlate with palatability. (1) Color determination plays a large role in quality determination, but data continues to show a poor relationship between color and taste. Attempts at quality improvements should evaluate factors such as aging and packaging for determining veal quality. Aging veal results in increases in tenderness, decreases in shear force, and increases in lightness and redness. Type of

packaging and the time interval between slaughter and packaging has a profound effect on meat quality and shelf life. For example, packaging veal within 24 hours post-mortem yielded a product that was lighter and had a longer shelf life than similar meat that was packaged later. (3) In conclusion, the veal industry should be evaluating factors that directly affect quality of the product. Less emphasis should be placed on color when, ultimately, taste and tenderness of the meat should be the determining factors in assessing the value of the product. Public education may be in order because often the consumer's perception of veal quality is based solely on the color of the meat in spite the lack of scientific evidence correlating veal color with meat quality.

Key Words: dairy, food, veal

198 Probiotics in yogurt and human health. Erin M. Sole* and Gustavo J. Lascano, *Clemson University, Clemson, SC.*

Gastrointestinal diseases are becoming increasingly prevalent in the medical society today with approximately 60 to 70 million Americans affected by gastrointestinal diseases every year. One method of combating these diseases is through the use of probiotics. Therefore, the aim of this presentation is to provide a review of the literature and a summary of what probiotics and yogurt are, how probiotics are selected, factors that influence the effectiveness of probiotics in yogurt, and how probiotics can benefit human health. A systematic literature research was conducted to further investigate this topic. Databases used included Google Scholar and the *Journal of Dairy Science*. One of the primary vectors for human consumption of probiotic is through fermented dairy products, especially yogurt. The bacteria of the genera *Lactobacillus* and *Bifidobacterium* are added to the yogurt either before or following fermentation and have been proven to positively affect gut health by improving the balance between beneficial and harmful bacteria. Although probiotics are not essential for survival, probiotics are highly recommended as they improve gut health, especially under conditions that decrease the normal microflora of the intestines, such as chronic and acute diseases, antibiotics, and age.

Key Words: probiotic, yogurt, microbiology

199 Protein pricing and promoting: A renewed outlook on milk. Jessica M. Sentelle*, David R. Winston, and Benjamin A. Corl, *Virginia Tech, Blacksburg, VA.*

Fluid milk consumption in the United States has steadily declined over the past several years. Whole milk consumption has declined the most by product as seen by data from USDA ERS. As consumers' tastes and preferences change, innovation in the dairy food industry must occur to sustain demand for dairy products. Recent promotions, such as "milk life" promote the nutritional aspects of milk. Fairlife ultra-filtered milk was recently introduced to capitalize on a growing demand for high protein drinks for the physically active consumer. After developing a patented cold-filtration process for milk, Select Milk Producers started a partnership with Coca-Cola to develop and distribute their dairy based protein drinks. Their products are offered in 4 varieties (whole, reduced fat, fat free, and chocolate); they are priced higher than conventional fluid milk. To obtain an ultra-filtered milk product, the founders of Fairlife use a patented cold filtration process that first concentrates the milk,

and then sterilizes the concentrate. The process differs from ultra-high temperature (UHT) processing and manages to avoid the characteristic burnt flavor of UHT milk (Maron and Corby, 2012). Milk components are separated to obtain a final product with twice as much protein, more calcium, less sugar, and no lactose. In a systematic review, Pasiakos et al. suggests that protein supplementation can enhance muscle mass and performance with adequate exercise procedures. This shows that high protein dairy drinks will be beneficial for active consumers. Ultrafiltration allows the separation of lactose to pick up a new class of lactose-intolerant consumers as well. In conclusion, consumption of fluid dairy products is steadily declining. As consumers' tastes and preferences change, innovation in the dairy food industry must occur to sustain demand for dairy products. Ultrafiltration and the new cold filtration process allow the separation and concentration of milk components to create a specialized product for different consumers. Pricing and promotion of new dairy products is very important to convey the proper message and increase demand.

Key Words: milk protein, lactose, ultrafiltration

200 Reinventing sweetness in dairy products. Halee L. Wasson* and Dale R. Olver, *Pennsylvania State University, University Park, PA.*

In recent years, high levels of sugars in dairy products have created health concerns among consumers. According to the Mid-Atlantic Dairy Association, the average American consumes less than 2 servings of dairy each day. This indicates that many school children and others are missing out on the vital nutrient package provided by dairy products. In fact, chocolate milk has been removed from some school lunch programs due to its high sugar content. As a result, dairy researchers and manufacturers are challenged to identify acceptable alternatives for sweetening. Recent studies have focused on chocolate milk and ice cream to identify methods that reduce sucrose content while maintaining flavor. Research at North Carolina State University demonstrated that reductions up to 30% of sugar content in chocolate milk did not influence acceptability among young consumers. These researchers also investigated ways to use lactose hydrolysis to reduce sucrose content in chocolate milk. However, they found that the additional lactose needed to achieve the sweetness of sucrose did not result in a reduction of calories. Reducing the sugar content in ice cream can be even more challenging. This is because along with being a sweetener, sucrose plays a vital role in Freezing Point Depression Factor (FPDF). The FPDF

is important to ensure the desired hardness is reached to maintain ice cream's scoopable properties. Researchers have studied the effects of using erythritol and maltodextrin as sucrose substitutes in ice cream. Erythritol is a sugar alcohol known for its zero calorie status, but it has a high FPDF. Maltodextrin has a similar molecular weight, solubility, and FPDF as sucrose. With these alternative sweeteners and others, it is still possible for ice cream to maintain key attributes such as being scoopable or holding its shape on a stick. The findings of these studies present potential solutions to alter the sugar content in dairy products while maintaining functionality and flavor.

Key Words: chocolate milk, ice cream, lactose hydrolysis

201 How fair is Fairlife? Sarah Genest* and Cathleen C. Williams, *Louisiana State University, Baton Rouge, LA.*

Coca-Cola is now distributing a new dairy product called Fairlife. It is milk that has 50% more protein, 30% more calcium, and half the sugar of regular milk. It is also lactose free. Recently, the consumption of soft drinks as well as milk has been declining. In the past 10 years, consumption of soft drinks has decreased 20%. Since 1970, consumption of milk has decreased by 37%. Coca-Cola believes that the recent interest in healthier food and drinks will drive consumers to buy Fairlife milk. A Coca-Cola executive even stated that she believed that Fairlife milk would make it "rain money." Milk is composed of water, fat, lactose, protein, and vitamins and minerals. Fairlife makes milk with more protein and calcium and less sugar by using cold filtration. The milk is pasteurized at a higher temperature than regular milk, but for a shorter time period. Then the cold filtration is used to separate the components of milk based on their molecular size. After this is completed, a larger ratio of protein and calcium are added into the milk. Lactase, an enzyme that breaks down lactose is also added. This ensures that Fairlife milk is lactose free. Fairlife was created by Sue and Mike McCloskey. They founded Select Milk Producers which is made up of family-owned farms. Their motto is "from grass to glass." They grow crops and formulate their own cow feed. The cows used to produce milk have freestanding stalls and are protected from harsh weather conditions. After the milk is collected, it is then loaded on Fairlife trucks and it brought to the plant in Michigan with only milk from that one dairy. It is processed and bottled in the same plant and then distributed to stores nationwide.

Key Words: cold filtration, milk, Fairlife