

Short Communication

Development of Gluten-Free Milk-Free Products

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A search for palatable and tasty gluten-free/milk-free products was performed in both local food stores and on the internet in the USA was performed. Searching for gluten-free breads, local groceries only available had these products in the freezer. Many items were not milk-free. Online one company provided slice bread along with hamburger and hot dog buns that were both gluten-free and milk-free. They were vacuumed packed and did not need refrigeration until opened. However, the bread products found in store often were freezer burned, often not tasty and a limited selection.

Gluten-free and dairy-free pizza could be found in the freezer section of stores. Baked were labeled gluten-free and milk-free. Many labeled such actually contained such items. Some companies labeled produced in environment that contains gluten and dairy. Prepared meals labeled gluten-free and dairy-free also were labeled incorrectly. A search for products such as substitutes milk products that were labeled gluten-free presented a unusual challenge. One would believe substitute milk products would not contain milk. Many contained curds, whey, and even milk in different percentages additionally they probably contained gluten.

Shelf items such as pasta, cake mixes and other bakery mixes even labeled gluten-free and milk-free often were not. Canned products such as soups, vegetables, fruits, and packaged meals even if labeled gluten-free and milk-free, individuals must read the labels to be sure. Many that claim gluten-free and milk-free have posted disclaimer that they are produced in an area that contains gluten and milk. This is an unacceptable label and practice. Products must be produced in a safe environment.

A gluten-free diet for life is recommended for Celiacs. As little as 1 milligram of gluten causes damage of the intestinal mucosa. European labeling gluten-free allows <200 ppm. A total of 300 mg. of gliadin/kg. was found in products labeled gluten-free (Biagi, 2004). Despite lack of symptoms, continued inflammatory damage occurs because of consumption of gluten (Catassi, 2007). Gluten grains are identified in the gliadin protein found in

wheat, triticale, rye, barley, and oats (Charbonnier,1980 and Ylimarki,1989). US/FDA adopted the ruling the same as Europe and does not recognize oats as a problem. Several assay analysis tests are available but differ widely in their results. This presents serious concerns on the validity of gluten-testing procedures for labeling. Producers are not required to list which assays they used to determine gluten-free. Who is protecting the consumer?

Low specific volume and hard crumb are associated with gluten-free baking (Miñarro, 2010). Hydrocolloids: Guar gum, hydroxypropyl methyl cellulose, and xanthium gum and buckwheat flour, egg powder and whey protein are suggested to formulate gluten-free bread (Mezaize, 2009). Gluten-free flours do not have elasticity of gluten. Denser, need flours starches, emulsifiers for texture, and taste (Hazen,2011). Gluten containing grains consist of barley, kamut, oats, rye, spelt, wheat and cultivated products from these products. The products that are gluten-free do not contain the prolamins of wheat, namely α -, β -, γ -, and ω gliadin subgroups causing the damage to the intestinal villi to individual with Celiac Disease. Products identified as gluten free are: acorns, almond, amaranth, arrowroot, bean flour, buckwheat, coconut, corn, guar gum, quinoa, palm, poi, potato, rice, sorghum, soy, sweet Rice, sweet Potato, tapioca, teff, and xanthum gum. Sources of milk free products include: coconut, rice, soy, almond, and corn.

Objectives are to provide good tasty nutritious food and drinks that are both gluten-free and milk-free. Using gluten-free grain(s) it is possible to develop a gluten-free/milk free sliced bread, French bread and/or Italian bread and specialty breads, and ready to eat meals. Better packaging can be obtained for frozen products. The current limitations are gluten-free grains do not have the elasticity and texture of the gluten grains. Producing similar products requires using alternate ingredients. This is necessary to create the same texture and taste of the gluten product. There is a need to provide a quality and larger supply of bread both gluten-free and milk-free. Celiac disease affects 1% of individuals in the United States (Fasano, 2003). Autism estimates to affect over 673,000 in the United States (Johnson, 2009). Milk is the most common of food allergies (Gonipeta, 2009).

At total of fourteen grocery and specialty stores in Louisiana were surveyed to identify available gluten-free bread. Some products were not available in stores. In many cases the some products contained milk and all products found in the freezer with freezer burn.

RVA Analysis of Flours: Triplicate analyses of rice, tapioca, potato, bean and what flours were performed which included analyses of several combinations. This was done to determine the viscoelastic behavior of the gluten-free flours and compare to wheat flour. Comparison revealed the 50/50 combination of rice/bean and the rice 50/bean 25/potato 25 were the closest creep recovery and viscoelastic behaviors compared to wheat. Texture analyses were performed on the French bread developed. This determined the quality of bread including hardness, adhesiveness, resilience, cohesive, springiness, gumminess, and chewiness.

General public subjects were recruited for a sensory study using the hedonic scale of 1 (dislike extremely) to 9 (extremely like). Gluten-free French breads were made. Subjects rated the gluten-free breads acceptable. There was a significant difference in the acceptance of the wheat bread compared to the gluten-free with an F value of 18.35 and Alpha level of $<.0001$. Celiac subjects were recruited to participate in a sensory study of the gluten-free

breads. The Celiac population study revealed both gluten-free breads as acceptable with hedonic rating over 5 in the 9 point scale.

Conclusion

Store searches indicated a lack of sufficient gluten-free milk-free bread products. Sensory studies of both the general and Celiac population statically showed the gluten-free milk-free French breads are acceptable. The multiple gluten-free grains and milk-free products are potentials to development bakery products and prepared meals that are tasty and nutritious. Disclosure products are produced in an unsafe environment is not sufficient. Specialty products must be produced in a dedicated environment. It is the responsibility of the producer to produce good, nutritious and safe food.