Natural Hi-maize Resistant Starch

Rediscover an Old Ingredient with Modern Health Benefits:

Hi-maize® Resistant Starch

February 25, 2010

National Starch FOOD INNOVATION

Resistant Starch Summary

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Resistant starch has been consumed for thousands of years and has recently been rediscovered as an important ingredient for maintaining health & wellness. However, as foods have become more processed and convenient, the amount of resistant starch in our diets has decreased. Individuals in developed countries such as the U.S., where processed foods are prevalent, are at a disadvantage as Americans consume approximately 5 grams of resistant starch per day.[1] Individuals in less developed countries who eat *fewer* processed foods consume 15 to 20 grams per day[2], the amount health experts recommend eating to obtain full physiological benefits. Health care professionals can help consumers meet these consumption targets by encouraging consumers to eat a healthy mix of whole foods and natural resistant starch-enhanced processed foods.

What is Resistant Starch?

Most starches are digested and absorbed into the body through the small intestine, but some resist digestion and pass through to the large intestine where, through fermentation, they act like dietary fiber. This type of starch is called "resistant starch." The formal definition of resistant starch is the total amount of starch, and the products of starch degradation that resists digestion in the small intestine of healthy people.[3]

Re-Discovering Resistant Starch in Foods

Resistant starch is naturally found in common foods such as legumes (beans and peas), whole grains, and even bananas (especially under-ripe bananas). When cooked and served cold as in salads, certain starchy foods (*i.e.* potatoes, pasta and rice, corn cereal) also contain resistant starch. Natural resistant starch is available as an ingredient with the brand name Hi-maize® resistant starch. It can be found in a growing group of commercial products such as bread, pasta and snacks. (For information on how to find foods with natural resistant starch, please visit www.resistantstarch.com.)

Benefits

Research from more than 300 peer-reviewed studies, conducted over the last 20 years, demonstrates that consuming Hi-maize natural resistant starch as part of a healthy eating plan provides **multiple benefits**:

1. **Natural resistant starch helps individuals increase their dietary fiber intake.** Hi-maize tests and labels as insoluble dietary fiber (measured by approved AOAC methods), and removes the barriers that have previously hindered people from eating sufficient fiber:
   - Hi-maize is a fine, white starch with a small particle size from a natural variety of non-GMO corn. Food containing Hi-maize retains its taste and texture and do not require people to change their dietary preferences. Hi-maize has been formulated into bread, crackers, cookies and other baked goods as well as cereal, pasta and snacks.
   - High levels can be consumed (even those exceeding the recommended intake of dietary fiber) with modest or no digestive side effects.[4-6]
   - It is available for home-use and can be added to foods like smoothies or oatmeal for an easy fiber boost. One tablespoon of Hi-maize 260 delivers 6.5 grams of dietary fiber, (more than the fiber in a bowl of oatmeal).

2. **Natural resistant starch increases satiety and may help with weight control**. With two-thirds of American adults overweight or obese[7], weight loss and maintenance as well as preventing initial or additional weight gain are concerns. Hi-maize can help in several ways:
   - Hi-maize contains fewer calories [8,9] (2-3 kcal/g) than flour (4 kcal/g). When Hi-maize replaces flour in foods, the calories in the product will be lower.
   - The consumption of products with Hi-maize can help individuals feel fuller in the hours after a meal[10] and even the next day.[11] It also has been shown to help people eat less after 2 hours[12] as well as over the proceeding 24 hours.[13]
   - Hi-maize may impact body composition by increasing fat oxidation and reducing fat storage after a meal.[14]

3. **Natural resistant starch helps with glycemic management.** Reducing the glycemic response of foods helps to smooth out the energy fluctuations experienced by individuals but also can have broad health implications, even in people with healthy glucose levels:
   - Hi-maize reduces the glycemic and insulin response of foods when it replaces flour or other rapidly digestible carbohydrates.[15]
   - Hi-maize consumption has been shown to reduce the glycemic response of a subsequent meal, independent of its postprandial glycemic impact.[16]
   - Hi-maize reduces the insulin response, even when the control food contained the same amount of glycemic carbohydrates.[17]
   - Hi-maize consumption has been shown to increase insulin sensitivity in healthy people,[18,19] in people with type 2 diabetes,[20] and in individuals with insulin resistance.[21]

4. **Natural resistant starch promotes digestive health.**
   - Hi-maize selectively increases beneficial bacteria, while suppressing harmful bacteria – what's called a 'prebiotic' fiber.[22]
   - The fermentation of Hi-maize increases SCFA production (butyrate is particularly important for colon health), which reduces intestinal pH and reduces the production of potentially harmful ammonia and phenols.[23]
   - Hi-maize promotes regularity with a mild laxative effect.[24]
   - Hi-maize assists in restoring normal intestinal function in individuals with diarrhea.[25-28]

5. **Corn-based resistant starch replaces wheat in gluten-free foods.** Hi-maize is made from corn and can replace wheat in foods that are required to be gluten-free. This is especially important for those individuals who have Celiac disease.
   - The fermentation of natural resistant starch produces more of the SCFA butyrate than other sources of fiber.[29] Butyrate has been shown to have anti-inflammatory properties and appears to be important in maintaining healthy colonic mucosal structure and function.[30]

To help people increase their intake of natural resistant starch, encourage them to eat foods with naturally occurring resistant starch and to purchase and consume products with natural Hi-maize resistant starch. ***For more information, please visit www.resistantstarch.com.***

February 10, 2010

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