Glycemic Index

The health-promoting benefits of vegetables are well-documented in scientific literature and potatoes have long held the prominent position of America's favorite vegetable for their versatility, taste and nutritional value. So why have so many diet books, popular magazines and self-proclaimed "nutritionists" told the American public to stop eating potatoes? They have been lured into believing that a controversial physiological measure known as the glycemic index (GI) is the silver bullet to managing weight.

Originally developed as a tool for the dietary management of diabetes, the GI has been indiscriminately promoted to the general public as a dietary tool for weight loss and disease prevention. A general lack of understanding of what the GI actually measures as well as its limitations has produced widespread confusion regarding carbohydrates among American consumers and an erroneous perception that starchy vegetables, such as potatoes, should be severely restricted or entirely eliminated from the diet.

Glycemic Index Defined

Almost all carbohydrates, regardless of the form in which they are consumed (e.g., starch, lactose, sucrose) are digested to glucose which then enters the bloodstream, causing a temporary rise in blood glucose levels. The GI generally describes the rate and extent to which a carbohydrate-rich food will elevate blood glucose levels relative to a reference food (typically either white bread or glucose). A food that causes a large and/or rapid elevation in blood glucose is considered a high GI food; one that causes a small and/or more gradual increase in blood glucose is considered a low GI food; a moderate GI food is somewhere in the middle.

The Hype About Carbohydrate Type

Proponents of diets based on GI try to "sell" their plans by oversimplifying glycemic index. They suggest that all starchy foods have a high GI. The fact is the glycemic indices of foods–even carbohydrate sources–don't fall neatly into low, medium or high GI categories. For instance, tables of GI show that the GI of starchy carbohydrate foods (e.g., potatoes, rice) vary widely (1,2).

Moreover, it has been *hypothesized* that carbohydrates that have a high GI cause obesity and a number of chronic diseases including diabetes, heart disease, and even colon cancer (3). In fact, despite the media hype, scientific evidence largely supports consuming moderate-to-high carbohydrate diet to prevent obesity and decrease the risk of chronic disease (4).

A Glycemic Gray Area

A number of factors have been shown to affect the GI of a food, rendering the usefulness and practicality of the GI in diet planning questionable at best (4).

- Ripeness: As a fruit ripens the GI tends to decrease, thus the GI of a green banana would be higher than that for a ripe banana (4,5).
- Processing: Grinding, rolling, pressing, mashing or even thoroughly chewing can increase the GI of a food (4).
- Preparation methods: The GI of a starchy food can be significantly reduced by cooking and then cooling (creating what is known as resistant starch). This is the reason that cooled potatoes have a significantly lower GI compared to potatoes consumed immediately after cooking (4).
- Variety or origin: The GIs of potatoes can vary greatly depending upon the variety as well as their origin (where they were grown). Russet potatoes have been historically classified as high on the GI; however, this classification may not be valid because GI values were estimated either from studies using potato varieties from outside

the United States or incorrect methods for measuring GI. The first study to examine the GI of US Russet Potatoes using valid methodology was published in April 2005 and showed that the GI of the US Russet Potato was considerably less than has been frequently reported in the literature. This makes it impractical to assign a blanket GI value to potatoes (2,4).

- Inclusion of other foods or condiments: The addition of protein and/or fat or increasing the acidity may also lower the GI. In the case of potatoes, adding common toppings such as cheese, butter, salsa, or vinegar (which increases the acidity) will lower the GI. Similarly, eating a baked potato with a chicken breast, lean meat, or fish will result in a lower overall GI (4).

Another key limitation of the GI, one that severely limits its practicality as a tool for diet planning, is that it generally does not correspond to nutrient density (i.e., nutrients per calorie). For example, the GI of potatoes is higher than that of ice cream or chocolate, yet few would disagree that potatoes are the more nutrient dense choice. Given the increasing prevalence of obesity in the United States, health and nutrition experts agree that greater attention should be given to consuming foods that are low in calories and high in nutrient density.

Finally, it should be emphasized that the GI is valid only for 50 grams of a *single*, carbohydrate-rich food. In reality, carbohydrate-rich foods are rarely eaten by themselves or in isolation of other foods, and research has shown that the presence of other macronutrients (e.g., fat and protein) can significantly alter the GI of a given carbohydrate-rich food.

Bottom Line

Because of the complexity of the GI as well as its inherent limitations, most nutrition scientists concur that the amount of carbohydrate as well as its nutrient density are more important than the glycemic index. In fact, the 2005 Report of the Dietary Guidelines Advisory Committee states, "Current evidence suggests that the glycemic index and/or glycemic load are of little utility for providing dietary guidance for Americans" (6). The 2005 Dietary Guidelines for Americans encourages consumption of a balanced diet that contains a wide variety of foods while staying within their energy requirements (7).

When it comes to weight control and disease prevention, nutrient dense carbohydrates including whole grains, fruits, vegetables (including potatoes), and low-fat or nonfat dairy products should form the basis of a healthful diet.

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7) 2005 Dietary Guidelines for Americans. U.S. Department of Health and Human Services, U.S. Department of Agriculture. www.healthierus.gov/dietaryguidelines

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