

# Glycemic Index and Athletic Performance

Dr. Jason Barker

## Glycemic Index

Key Points:

- Glycemic index is a measure of how rapidly a carbohydrate is absorbed into the bloodstream
- The glycemic index of foods can be used to determine proper fuel choices for athletes
- Glucose has the highest glycemic index of all foods

Complex carbohydrates are vital nutrients for energy production in the human body, providing glucose, the body's main energy currency. Carbohydrates are a diverse group of nutrients; they are contained in many plant-based foods and have varying effects on the body's energy levels.

Carbohydrates affect energy levels based on how rapidly they can be absorbed into the bloodstream, or the speed at which they raise blood sugar. This is referred to as the glycemic response. The rate at which a carbohydrate is broken down into its most simple unit, glucose, determines the glycemic response. Glucose directly fuels the muscles, brain and nervous system of athletes at all stages of exercise (before, during and after). The quicker a carbohydrate becomes glucose, the faster blood sugar will rise and deliver energy to working muscles.

The glycemic index is a scale that categorizes the glycemic response of a carbohydrate or other type of food. The glycemic index (GI) is based on a numerical scale of 1 to 100. Foods are classified as having a low, moderate or high glycemic response based on where they fall on the scale. The glycemic index can be used to gauge how a certain food, or combination of foods, will affect blood sugar and energy levels.

The GI of a food is determined by measuring blood glucose levels for two hours following ingestion of a 50-gram serving of food, and then comparing those numbers to that of pure glucose, which is the standard for all GI comparisons (glucose is assigned a 100 on the GI scale).

For instance, a food with a GI of 65 will raise blood sugar only 65% as quickly as pure glucose. Higher GI foods will raise blood sugar more quickly and to a greater extent than lower GI foods. Higher blood sugar means that more insulin will be

secreted, pulling the glucose into working muscles and organs and providing them with energy.

Following exercise, a high GI food will lead to greater and more rapid storage and replacement of glycogen (the storage form of glucose) in the muscles and liver.<sup>1</sup> High GI foods are nearly always preferable for athletes.

Prior to exercise, consuming high GI foods will rapidly infuse the blood stream with needed energy.<sup>2</sup> In order to sustain energy levels and blood glucose levels during exercise, periodic ingestion of high GI foods will keep blood glucose at adequate levels to sustain energy. Following exercise, high GI foods are preferred in order to maximally replace the energy stores (glycogen) that were utilized during the event.

Low to moderate GI foods are recommended when the need for rapid energy infusion is low, such as during mealtimes when all the other nutritional needs of an athlete are being met.

### **Glycemic Index of Various Carbohydrates<sup>3</sup>**

Glucose	100
Fructose	12
Sucrose	65
Lactose	43
Honey	48
Orange Juice	57
Soda	63

### **Glycemic Index of Various Sports Drinks<sup>3</sup>**

Glukos	100
Gatorade	78
Cytomax	62
Allsport	53

1. Burke, L. Collier, G. Hargreaves, M. (1993). Muscle glycogen storage after prolonged exercise: effect of the glycemic index of carbohydrate feeding. *Journal of Applied Physiology*, 75, 1019-1023.

2. Sherman, W. (1991). Carbohydrate feedings before and after exercise. In: *Perspectives in Exercise Science and Sports Medicine*, (Vol. 4, pp. 1-34). Indianapolis: Benchmark Press.

3. Online document at [www.glycemicindex.com](http://www.glycemicindex.com)  
Last accessed 3/20/15