

## Eat Right for a Rapid Recovery

Athletes need to eat right to maintain maximum capacity. We all understand this. But when we eat is just as important as what we eat. The highest energy foods come mostly from the carbohydrate group (CHO). Athletes should consume at least 70 percent of their calories from CHO. Breads, grains, cereals, vegetables, sugars, pastas, fruits, and beans all qualify as CHO. When these foods are eaten can significantly influence the rate of muscle glycogen replacement. After a hard workout the muscles are depleted. They need replacement quickly. But replacement continues throughout the day at a specific rate. Eating appropriately can enhance the replacement rate.

The CHO group will replace the lost glycogen with greatest efficiency. This group consists of three subsections. The three subsections are divided according to the glycemic index. Foods that quickly release glucose, the main replacement food for muscles, are listed high on the glycemic index. Foods that are slow to release glucose are listed lower. Sugars, syrups, breads, and potatoes are high glycemic index foods. Milk, yogurt, and most beans are low index foods. Eating high on the glycemic index will replace lost glycogen most quickly.

The timing of glycogen replacement is also important. According to Edward Coyle, PhD, and Effie Coyle, MA, RD, LD, in their article in the *Physician and Sports Medicine*, Feb. 1993, the timing is just as important as the type. Muscles absorb glycogen fastest in the two hour period immediately following exercise. This absorption is maximized by eating 50 grams of high glycemic index foods. Even at this rapid rate, the replacement will occur at only seven to eight percent per hour. However, after the two hour window, the replacement occurs at only five percent per hour. For an athlete on a frequent workout schedule, this additional replacement in the initial two hours is important. At only five percent per hour, it would take 20 hours at optimum replacement rates to fully replace lost fuel.

The recommendations of the authors are to eat 50 grams of high to moderate glycemic index foods immediately after exercise, then to continue to eat 50 grams every two hours until a large meal is consumed. Four hours after exercise, any CHO foods, whether high or low on the glycemic index, will result in a five percent per hour replacement rate. Any fats consumed will lower the replacement rate. Proteins seem to have a variable influence.

What exactly are high glycemic index foods? Here is a brief list with recommended measures for 50 grams.

High Glycemic Amount for Medium Index Foods 50 g CHO Index Foods 50 g CHO

Glucose 4.2 tbsp. Oatmeal 2.1 c

Sucrose 4.2 tbsp. Rice 1 c

Cane and maple syrup 4.2 tbsp. Pasta 1.5 c

Corn syrup 4.2 tbsp. Honey 4.2 tbsp. Grapes (am.) 3.1 c Molasses 4.2 tbsp.

Grapes (eur.) 1.8 c 6% sucrose solution 3.5 c Orange (5 oz.) 3 7.5% maltodextrin & sugar 2.8 c Yellow corn 1.2 c 10% corn syrup 2.1 c Yams 1.3 c 20% maltodextrin 1.1 c Baked beans 0.9 c Bread (white or whole grain) 3.5 slices Corn flakes 2 c Raisins 0.41c Potato (baked) 7 oz. Potato (mashed) 1.5 c

These recommendations are for a 70kg athlete, about 154 lbs. Adapted from Coyle, EF: Timing and method of increased carbohydrate intake to cope with heavy training, competition and recovery. J Sports Sci 29-51: 1991.

All other foods will have lower glycemic indexes or were not investigated for this article. A quick glance will tell you that the sweeter the food the higher on the index it is placed. The exception are the fruits. They generally score lower due to the high concentration of fruit sugar, fructose. Fructose has to be converted to glucose before it is useful. This lowers its overall rating.

The easy recommendation is: Immediately following exercise eat 50 grams of high glycemic index foods. Continue to consume 50 grams of high to moderate glycemic foods every two hours until a full meal is consumed. Make CHO 70% of your total calories for every meal.

Following these guidelines will replace the lost muscle glycogen most quickly. This allows for fastest recovery.

## Reference

Coyle EF: Carbohydrates that speed recovery from training. Phys Sports Med. 21(2), 111-123.

*John McDaniel, DC, CCSP  
Mountain View, California*

DC

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