

## Carbohydrate Loading: Load Up on What?

By Rebecca Marks Rudy, MS  
Nutritionist for Trismarter.com

*"In an Ironman you've got to be patient, you've got to make sure your nutrition is right...  
Ironman is all about nutrition."*

-Michellie Jones , Winner, 2006 Ford IM Arizona

These days if you want to compete in an Ironman distance triathlon you likely have to commit a year in advance in order to secure a number. You dedicate the next 12 months to following a training plan, investing in gear and practicing sound nutrition. In the week leading up to the race you then find yourself with more time on your hands as you let your muscles rest. This is a perfect opportunity to turn your focus to nutrition, and more specifically, to carbohydrates. However, this plan goes beyond eating a plate of pasta the night before your race: Carbohydrate loading is a multi-day, multi-food group practice.

### **Out with the Old, In with the New**

When the concept of carbohydrate loading was first researched and promoted, the classic practice was a three-stage formula. One week out from competition the athlete completes an exhaustive training session (90 minutes or longer) to deplete the body's glycogen store. Over the next 3 to 4 days the athlete consumes a diet very low in carbohydrate, with about 10 percent of calories coming from carbohydrate. At the same time he or she tapers the training. In the final 3 to 4 days before the race the athlete then alters his or her diet to include 90 percent of his or her calories from carbohydrate and, in terms of training, continues to taper and rest.

This classic method of carbohydrate loading became less popular with athletes as they realized the high risks involved with exhaustive training session one week before competition, as well as the extremes involved in the diet, where a very low carbohydrate intake can leave athletes feel lethargic not to mention cranky. Enter the modified carbohydrate loading method.

Similar to the classic plan, start your carbohydrate loading program one week out from race day. Complete your last long training session, but the goal is not glycogen depletion. Over the next few days continue to follow a mixed diet while continuing to taper. Starting four days out from race day is the optimal time to increase your calories from carbohydrate up to about 70 percent of your total calories. You may already be taking in 60 to 65 percent of your calories from carbohydrate, so adding a large bagel a cup of strawberries each day could make up that differential (see sample day for energy and carbohydrate values).

## **Calculate Your Carbohydrate Demands**

Even within these guidelines, speaking in terms of percentages is too vague because caloric needs of endurance athletes vary. A more tailored approach is to consider amount of carbohydrate against the weight of the athlete. During your taper week, aim for up to 4.5 grams of carbohydrate per pound of body weight. An athlete who weighs 150 pounds will consume approximately 675 grams of carbohydrate. This, in turn, translates to 2700 calories from carbohydrate alone.

So, you whip out your calculator and you determine how many grams of carbohydrate you need. Yet the next steps may prove trickier than the calculations. While most of us can identify that pasta provides carbohydrate, could you describe a serving size? Furthermore could you guess how many grams of carbohydrate exist in that serving? Certainly it is easy for a sports nutrition expert to develop a meal plan for you with the required servings of carbohydrate, and even insert suggested food selections. However, with a basic understanding of food group profiles you can make healthful, carbohydrate-rich selections.

## **Identify Healthful Options**

Before consulting the following table for a guide to carbohydrate sources, consider some general tips. The optimal carbohydrate dense foods include whole-grains and complex starches. For example, 100 percent whole-wheat bread exceeds the nutritional value of processed white bread; a baked potato with the skin surpasses skinless creamed mashed potatoes; whole fruits (or even fresh pressed juice) beat refined fruit drinks; brown rice trumps white rice. These nutritionally dense carbohydrate choices provide more fiber, protein, vitamins and minerals than their refined counterparts. As a result, unrefined carbohydrates can leave you more satisfied and better nourished. Does this mean that you have to forego your favorite indulgence of ice cream or chocolate chip cookies? Of course not; include your treat of choice in moderation (one to two servings a day), and avoid letting those calories preclude your selecting more healthful foods. Along similar lines, because your training sessions are shorter you should not need to supplement your workouts with sports drinks or energy bars; these are calorie contributors that are not necessary at this time.

## **Welcome the Water Weight**

Some athletes do worry about caloric intake before a race because they do not want to carry additional weight. To gain a pound in the course of a week you would need to consume 3500 additional calories, or 500 extra per day. You might also achieve this by expending 500 calories fewer per day. With your decreased training it is possible that your energy balance is disrupted, but your appetite should compensate naturally. Your response to hunger at this time is crucial; to the best of your ability eat when you are hungry and stop when you are full. To that point, it is important to recognize that carbohydrate loading, also called

glycogen supercompensation, can cause you to retain an advantageous 2 to 3 pounds of water—fluid that promotes hydration for race day. Each gram of stored glycogen holds three grams of water, hence the additional weight. In fact, tracking this water related weight gain is a good way to monitor that your carbohydrate loading is taking effect.

### **Practice Your Plan**

A final message, and perhaps the most important, is this: Never try anything new on race day, or in the few days heading into competition even if the new selection is an effort to increase carbohydrate content. If you have never had a high-fiber bran cereal, three hours before your big race is not the time to experiment. Or if you suspect that you are lactose intolerant, avoid dairy products. Similarly, if you are unsure of your reaction to caffeine, stay away from colas and chocolate. The better time to experiment with new foods is in training; set up a mock taper week combined with carbohydrate loading earlier in the season. Additionally, use your C-priority races as practice templates for your pre-race preparations. It is better to stick with your tried and true pre-race plans. After all, with one ill-fitting food choice you wouldn't want to compromise the race to which you committed a year ago.

Food Group	Carbohydrate	Energy Provided	Example
<b>Starch</b>	15 grams per serving	80 calories per ounce breads pasta (dry weight) 80 calories ½ cup beans ½ cup oatmeal 1/3 -1/2 cup rice 100+ calories ½-1 cup dry cereal cereal bars, energy bars waffles, pancakes, muffins	Bagel (varies in weight) Beans* Cereal Corn* English muffin Pasta Potatoes*, white and sweet Rice Tortilla/wrap
<b>Fruit</b>	15 grams per serving	60-80 calories on average serving size varies by fruit  100+ calories fruit, dried with added sugar	Apple, medium (5 oz) Banana (4 inches) Berries (3/4 cup) Grapes (15 grapes) Orange, medium Mango (1 cup) Melon (1 cup) Raisins (2 tablespoons) Watermelon (1.5 cups)
<b>Vegetable</b>	5 grams per serving	30 calories ½ cup cooked or 1 cup raw 2 cups leafy greens  100+ calories 1-2 cups vegetable based soup	Broccoli Carrots Cauliflower Peppers Romaine lettuce Spinach Squash Tomatoes
<b>Dairy</b>	12 grams per serving**	90 calories 1 cup skim milk or light yogurt 120 calories 1 cup low-fat milk (1%) 250 calories	Milk Milk, lactose free Cottage cheese Yogurt, light or plain Yogurt, drinkable

		1 cup low fat yogurt with fruit	Soy beverage
<b>Protein</b>	0 grams per serving	15 calories egg white or ¼ cup Egg Beaters 30 calories per ounce water packed canned tuna 75 calories whole egg 45+ calories per ounce fatty fish poultry, so skin soy based meat analogs 60-100 calories per ounce meats: beef, game, ham, pork (calories depend on fat content)	Beef Chicken Egg Beaters Ham Hard boiled eggs Omelets Salmon Tuna Turkey Turkey bacon/sausage Vegetarian bacon/sausage
<b>Fat</b>	0 grams per serving	45-135 calories per tablespoon Varies if light or regular	Butter (light) Canola Oil Cream cheese (light) Margarine (light) Nuts/nut butters*** Olive oil Peanut oil Soybean oil Walnut oil

\*Starchy vegetables are more similar in carbohydrate content to starches than they are to vegetables; beans (legumes) are also considered a good source of vegetarian protein

\*\*Carbohydrate content increases if yogurt or cottage cheese is sweetened with fruit and/or sugar or if milk is flavored with syrups, such as chocolate, coffee or strawberry; regular cottage cheese has about 6 grams of carbohydrate per cup

\*\*\*Peanut butter is considered half-fat, half-protein (vegetarian); carbohydrate content is low (6 grams) if natural style, but increases to 10 to 15 grams if sweetened with added sugar

**Sample Day of Carbohydrate Loading Phase: 70 percent Carbohydrate\***

<b>Food Selection</b>	<b>Carbohydrate (grams)</b>	<b>Calories</b>
<i>Breakfast</i>		
1 cup oatmeal	30	175
2 Tablespoons brown sugar	18	70
2 Tablespoons raisins	16	60
1 medium banana	30	110
1 non-fat vanilla yogurt	40	205
12 ounces fresh orange juice	39	170
<i>Morning Snack</i>		
2 Tablespoons peanut butter	7	190
1 large apple	30	110
2 fat free Fig Newtons	31	135
1 cup skim milk	12	85
<i>Lunch</i>		
2 ounces turkey	0	110
1 wheat bagel (4 ounces)	63	320
lettuce and tomato	2	10
2 Tablespoons cranberry sauce	13	50
15 baby carrots	10	45
2 Tablespoons hummus	4	45
2 ounces baked potato chips	46	220
1 cup apple sauce	28	105
<i>Afternoon Snack</i>		
2 cups Honey Nut Cheerios	36	170
1 cup skim milk	12	85
1 cup sliced strawberries	15	50
<i>Dinner</i>		

3 ounces chicken	0	125
2 cups wheat penne	64	295
½ cup roasted tomato sauce	9	50
1 cup broccoli	4	20
1 cup minestrone soup	21	125
1 wheat dinner roll (3 ounces)	44	225
1 Tablespoon garlic olive oil	0	125
<i>Dessert</i>		
1 cup fat free pudding	46	210
<b>TOTAL</b>	<b>670</b>	<b>3700</b>

\*This sample day includes 70 percent of calories from carbohydrate, 16 percent from protein and 14 percent from fat.

Rebecca Marks Rudy, MS, is a Sports Nutritionist for Trismarter.com.

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