

FACTSHEET: TRIATHLON

KEY POINTS

- ▶ Triathlon is a physically demanding individual sport characterised by the combination of three disciplines; swimming, cycling and running performed in succession.
- ▶ Carbohydrates are important in a triathlete's diet, especially in the days leading up to a race to maximise muscle and liver glycogen stores.
- ▶ High training volumes typically found with triathlon requires the athlete to ingest adequate carbohydrate, protein and fluid post exercise.
- ▶ Sweat rates can vary between 200ml – 3 Litres per hour during triathlon training or competition, which needs to be replaced to avoid reductions in exercise capacity and negative effects on health.

INTRODUCTION

Triathlon is becoming increasingly popular in the UK, and competition typically lasts between 50 minutes (sprint distance) and 8-16 hours (Ironman distance), the table below outlines traditional distances races:

Triathlon	Swim (m)	Cycle (km)	Run (km)	Typical duration
Sprint	750	20	5	50 – 90min
Olympic	1500	40	10	1hr 50 – 2hr 30
Half Ironman (70.3)	1900	90	21.1	3hr 50 – 6hr
Ironman	3800	180	42.2	8hr – 16hr

The physique of a triathlete can vary considerably depending on the competitive level and training load of the individual. It can therefore be beneficial to follow a bespoke nutritional plan tailored to support training and adaptation to exercise by using the guidelines shown in this guide.

NUTRITIONAL CONSIDERATIONS

A triathlete's diet should consist of 50 – 70% carbohydrate, 15 – 25% protein, and 20 – 25% fat, as proportions of their daily energy intake. The amount of each macronutrient can be manipulated to reflect intensity and volume of training. For example, a triathlete will require more carbohydrate to support training demands for an Ironman compared to a sprint distance race.

DAILY CARBOHYDRATE RECOMMENDATIONS

As carbohydrates are important in a triathlete's diet it is important to meet daily recommendations, especially in the days leading up to a race to maximise muscle and liver glycogen stores. As a general guide carbohydrate intake should be between 5 – 12g per kilogram body weight per day (g/kg



BW/day), the amount increasing as volume and intensity of training increases. For example, a 70kg triathlete would need between 350 – 840g carbohydrate per day. The table below is a quick guide for how much carbohydrate to ingest based on daily training volume.

Training time per day (hours)	Carbohydrate per day during training (g/kg BW/day)	Carbohydrate per day prior to racing (g/kg BW/day)
Sprint distance triathlon (1 hour/day)	5 – 7	7 – 8g, 1 – 2 days pre race
Olympic distance triathlon (1 – 3 hours/day)	6 – 10	7 – 8g, 1 – 2 days hours pre race
Half Ironman/Ironman (≥4 – 5 hours/day)	8 – 12	10 – 12g, 2 – 3 days pre race

Adapted from Burke et al. 2011

It is worth noting that during the lighter training week before a race, food intake will need to taper to avoid weight gain, however carbohydrate loading 1 – 3 days before a race may be necessary to increase liver and muscle glycogen stores. See the table above for pre race carbohydrate recommendations based on discipline.

PRE RACE STRATEGIES

Pre-Race Nutrition (3 – 4 hours preceding race)

Typically, triathlons start early in the morning and as athletes essentially fast overnight eating a breakfast high in carbohydrate is crucial for race preparation by topping up glycogen stores. Triathletes should aim to eat a meal which contains 1-2g/kg BW carbohydrate, and is also low in fat and fibre which can slow digestion. For example, 1 large bowl of porridge with berries + 1 slice of white toast with honey gives roughly 480kcal, 80g carbohydrate and 20g protein.

Pre-Race Fluid Consumption

Dehydration in excess of ~2 - 3% body mass (~1.5 - 2 litres of water for a 70kg person) impairs endurance (aerobic) exercise performance (Mountain, S. J. 2008). Therefore, no matter what discipline of triathlon, athletes should ensure they are adequately hydrated prior to racing. Ingestion of 500ml fluid containing sodium, 3 - 4 hours before the event is recommended, with a further 200ml 2 hours before.

DURING RACE STRATEGIES

Nutrition

The best opportunity to consume energy and fluid during a race is on the bike ready for the run. For races 2 hours and longer the ingestion of 60-70g carbohydrate per hour is recommended, e.g. sports gels, sports drinks containing carbohydrates or jelly sweets. Tolerance to certain foods/drink is an important consideration as many triathletes will display symptoms of intestinal discomfort during races. It is suggested to practice nutritional interventions in training rides prior to competition.

Fluid Consumption

During longer races and when racing in the heat, athletes should look to ingest 150ml of fluid every 10-15 minutes along with some form of electrolytes (e.g. salt), as they are lost through sweat. However drinking copious amounts of water



exceeding sweat loss can lead to negative effects such as the development of hyponatremia (a severely low blood sodium levels), which is potentially lethal. Athletes are therefore advised not to over drink during a race.

POST RACE STRATEGIES

Nutrition

It is important to consume a source of carbohydrate as soon as possible after the race to replenish muscle and liver glycogen stores. For example a toasted bagel with peanut butter or a chocolate milk smoothie and banana.

The ingestion of protein is an area which is sometimes overlooked by triathletes. Protein is a key nutrient to support and develop muscle and therefore a triathlete should consume 20g of protein post exercise, from sources such as eggs, chicken, beans or protein supplements.

Fluid Consumption

Athletes are advised to drink enough fluid to replace 150% of their body weight lost via sweat as soon as possible after training as well as competing. The amount of sweat lost during exercise is highly individual and can also be influenced by weather conditions. Obtain an estimate of sweat rate using pre and post weighing to provide an indication of how much fluid is needed to rehydrate. This can be done by measuring body weight before and after training, correcting for fluid intake.

OTHER CONSIDERATIONS

Caffeine

Caffeine has been shown to increase alertness and improve concentration. Some athletes may wish to use 1 – 3 mg/ kg BW caffeine 45 – 60 minutes prior to competition, after trialling their tolerance to caffeine in training (Pasman et al. 1995). It should be noted that a low to moderate caffeine intake per day (i.e. 3 - 6 cups of coffee per day), has been shown not to have a diuretic effect (Killer et al. 2014).

REFERENCES Burke, L. M., Hawley, J. A., Wong, S. H. S., Jeukendrup, A. E. (2011). Carbohydrates for training and competition. *Journal of Sports Sciences*, 29(S1): S17-S27.
 Burke, L. M. (2008). Caffeine and sports performance. *Applied Physiology, Nutrition and Metabolism*, 33, 1319-1334.
 Killer, S. C., Blannin, A. K., Jeukendrup, A. E. (2014). No evidence of dehydration with moderate daily coffee intake: A counterbalanced cross-over study in a free-living population. *Plos One*, 9(1): e84154.
 Mountain, S. J. (2008). Hydration Recommendations for Sport. *Current Sports Medicine Reports*, 7 (4), 187 – 192.
International Journal of Sports Medicine, 16 (4), 225-230.