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## NUTRITION GUIDE



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## NUTRITION - THE 4TH DISCIPLINE



### NUTRITION: THE 4TH DISCIPLINE

Nutrition is without doubt one of the most important aspects of race preparation, yet athletes typically spend far more time thinking about training than about nutrition. Hours and hours are spent in the pool, on the bike and on the trails. Far less time is spent on careful nutrition planning. Nutrition is sometimes called the 4th discipline and this is for a reason. Nutrition can mean the difference between winning a race and not even finishing a race. Athletes who did not have a great race often state that it was caused by nutrition related issues: they ran out of energy, became dehydrated or experienced stomach problems. They ingested too much, or ingested too little. They tried new products they had not used in training and so on. This guide will give you the background information and guide you to a successful nutrition strategy.

#### NUTRITION JUST BEFORE THE RACE START



In the hour before the start you can continue to top up liver glycogen stores. However, drinks and foods will sit in the stomach for a while and absorption takes time. Therefore, most of the carbohydrates you ingest will become available during the race. So anything that is ingested shortly before the start is part of your nutrition during exercise. What is best to take depends on personal preferences as well as the overall nutrition plan. Use something you have tried several times before.

#### NUTRITION DURING THE RACE



Race nutrition requires a bit of planning. It is important to study what is available on the course and develop a plan that takes into account foods and drinks you will collect on the course and foods and drinks you will have to bring yourself. During longer races your target carbohydrate intake should be higher than during shorter races. Races over 2 hours can benefit from an intake of roughly 60 grams of carbohydrates per hour. Ingesting more carbohydrates will not result in further benefits unless you start use specific carbohydrate blends. For the more advanced athlete it may be worth considering higher intakes and the use of carbohydrate blends, for more information see [www.rucssportscience.com](http://www.rucssportscience.com), but for many athletes an intake of up to 60 grams of carbohydrate per hour is the safest option. Carbohydrates can come from various sources (drinks, energy drinks, gels, bars and other foods). It is possible to mix and match, and the best combination mostly depends on personal preference.

#### CARBOHYDRATES ARE THE PERFORMANCE FUEL



The body uses two main fuels: carbohydrates and fat. Even the leanest athlete has sufficient fat to sustain the longest races, but carbohydrate reserves are small and can only fuel up to 2 hours of intense exercise. Yet, carbohydrates are the most important fuel as it is necessary for higher intensity exercise. Carbohydrates are the performance fuel. Carbohydrates can deliver energy much faster to the muscles than fat. Unfortunately, carbohydrate stores are relatively small. Carbohydrates are stored in the body as

glycogen in the muscles and in the liver. In the muscle we have roughly 500-600 grams and it is possible to run out of carbohydrates in less than 2 hours. Running out of fuel is often called "hitting the wall" or referred to as "hitting the wall".

**CARBOHYDRATE STORES ARE SMALL AND THEREFORE NEED TO BE TOPPED UP, E.G. BY USING DRINKS, GELS AND/OR SOLID FOODS**

#### GOOD CARBOHYDRATE SOURCES FOR TRAINING

- muesli
- high fibre cereals
- seeded and multigrain breads
- bananas and other fruits
- dried fruits
- fruit juices
- potatoes
- pasta
- rice (brown)



#### GOOD CARBOHYDRATE SOURCES FOR RACE DAY

- refined grains (white rice)
- cooked cereals
- cornflake based cereals
- white bread, bagels (no seeded breads)
- pancakes
- cooked veggies (no beans)
- cooked potatoes
- ripe bananas
- cooked fruits, apple/pear/fruit blends
- rice cakes
- honey
- tyrosin
- pulp-free juice





# ENHANCE YOUR PERFORMANCE

## BAR

Solid foods usually provide more carbohydrates per unit of weight and are therefore a very effective energy source to carry. It is recommended to select energy bars that are low in fat, fiber and protein as these ingredients will slow down gastric emptying and may contribute to stomach problems. Solid food is great in preventing an empty feeling in the stomach that many athletes experience during later stages of a race. It comes down to personal preference whether you want to chew food during a race or not. Some athletes struggle to chew food during a race and prefer to get their carbohydrates from gels.

## ENERGY DRINKS

Energy Drinks can be found on the shelves of many stores. They can serve as a source of carbohydrates and caffeine during longer duration events. Sugar free versions contain caffeine and could be used in shorter events when carbohydrates is less important. Caffeine can have positive effects on performance even when caffeine is consumed in relatively small amounts (single body weight, 200mg for a 70kg person). In addition, concentration and awareness have been shown to improve with doses as little as 10mg of caffeine. Always make sure caffeine intake is timing before using it in races as athletes respond differently. Other sources of caffeine include chocolate gel, iced drinks and coffee (see table below).

PRODUCT	CAFFEINE	CAFFEINE	CAFFEINE	CAFFEINE
ENERGY BAR	10-20mg	10-20mg	10-20mg	10-20mg

"Thanks to the use of caffeinated drinks to make sure they can be tolerated well." It is recommended not to exceed a daily intake of 400mg of caffeine from all sources so always check labels for exact amounts.

## GELS

Gels are a compact form of energy. A small volume of fuel with a relatively large amount of carbohydrates. Gels typically deliver 20-25 grams of carbohydrates and come in many different flavors. Gels may be caffeinated or non-caffeinated. It is important to realize that gels need to be ingested with sufficient water to make sure gastric emptying is fast and no stomach problems develop. The exact number of gels you need depends on your pace, the duration of exercise (race or training) and the amount of carbohydrates you get from other sources.

- TAKE GELS JUST BEFORE AFTER STATION WHERE YOU KNOW WATER WILL BE AVAILABLE
- THEN DRINK A COUPLE OF CUPS OF WATER WITH EACH GEL

## CARBOHYDRATE DRINKS

Carbohydrate drinks typically contain carbohydrates in concentrations of 6-7%. This means that the drink contains 60-70 grams of carbohydrates per liter of fluid. A regular sports bottle of 500 ml (20 fl. oz.) will therefore deliver roughly 30 grams of carbohydrates. A sports drink also contains some sodium (and other electrolytes) which can be beneficial for the absorption of fluid (as we will see under 'improving fluid delivery').

## GOOD CARBOHYDRATE SOURCES DURING EXERCISE

ENERGY BAR	10-20g	ENERGY DRINK	20-30g
GEL	20-25g	SAVANA	20g
SPORTS DRINK	15-20g		

Food items in this list are not intended

# STAYING HYDRATED

## IMPROVING FLUID DELIVERY

Fluid delivery can be accelerated by adding some carbohydrates to water as well as sodium. Fluid delivery will be improved if highly concentrated carbohydrate solutions are used. Therefore, if you are using gels, make sure to drink enough water to avoid highly concentrated stomach contents. The same is true for solid foods (e.g. for energy bars).

## DEHYDRATION

Another cause of fatigue is dehydration. In order to cool down the body we sweat. The faster we run and the more power we produce on the bike, the more heat is produced and the more we need to sweat in order to stay cool. In hot conditions sweating may be the only way we can cool down our bodies. When we lose too much sweat and become dehydrated it becomes harder to maintain body temperature. Some degree of dehydration is unlikely to be a problem but once you start to lose 2% of your body weight or more, performance may be affected.

## CALCULATION OF SWEAT RATE

Measure your body weight before and after training and record everything you drink.

$$\text{WEIGHT BEFORE (KG)} - \text{WEIGHT AFTER (KG)} + \text{FLUIDS CONSUMED (L)} - \text{URINE PRODUCE (L)} = \text{SWEAT LOSS (L)}$$

$$\text{SWEAT RATE (L/H)} = \text{SWEAT LOSS} / \text{DURATION OF TRAINING (H)}$$

In order to prevent dehydration, it is important to start a race hydrated. Drink at least 500 ml in the 2 hours before the race, excess water will be eliminated through urine. Double check your urine color is pale. To prevent dehydration during a race drink at rates similar to your sweat rate. You can work out your sweat rate by regularly measuring yourself on a simple scale before and after training, record body weight and correct it for the amount of fluid consumed (see below). If you do this regularly and in different conditions (hot and cold weather conditions), you will get a good idea of your sweat rate. Your target for fluid intake should help you to lose no more than 2% body weight. Drinking to thirst can in some cases achieve the goal as well but it is a hard to go into a race with a gain.

# TRAINING YOUR RACE NUTRITION

## RACE NUTRITION STARTS WEEKS BEFORE THE RACE

Start to train with your nutrition at least 6-14 weeks before the race (but ideally even longer). Choose at least one day a week where the goal of the training is to practice your race nutrition strategy. If your plan is to take up to 100 grams of carbohydrates per hour in the race, try to go a little higher in training. It is ok, if it feels a little uncomfortable in training - your gut can adapt and you will benefit on the race day. When you are training with your race nutrition or you are training to adjust the intestine to absorb more carbohydrates we refer to this as 'train high'. Using gels and energy drinks in training can be a way to get used to what you would use in a race, but it is also a way to incorporate caffeine into the training for those who choose to do this. Caffeine might help to improve the quality of training. For those athletes who just want the caffeine and do not want the calories, sugar free energy drinks are available.

## "TRAIN HIGH" AND "TRAIN LOW"

Some days it is good to 'train high' (train your race nutrition) on other days you may want to experiment with 'training low' (this term is used to refer to training with low carbohydrate availability), making sure that your body can also perform with fat as a fuel. Training sessions that athletes often include are training without breakfast (training with low liver glycogen) or training twice a day with little carbohydrate intake in between (training with low muscle glycogen). There is evidence that such strategies will enhance the ability to use fat as a fuel. However, it must also be noted that more recovery time is needed, training is harder, and you will be more likely to develop symptoms of overtraining and compromise immune function if done too often.

# RECOMMENDED DAILY CARBOHYDRATE INTAKE AS A FUNCTION OF TRAINING LOAD

TRAINING LOAD	RECOMMENDED DAILY CARBOHYDRATE INTAKE
RECOVERY TRAINING (2-3h)	10-12g/kg PER DAY
EXERCISE TO MAINTAIN TRAINING (3-4h)	10-12g/kg PER DAY
VERY LONG ENDURANCE TRAINING (4-6h)	12-15g/kg PER DAY
LONG AND INTENSE TRAINING (4-6h)	12-15g/kg PER DAY

## CENTRAL DIET

Although on some days there should be a focus on 'train low', other days there should be focus on 'train high'. In general carbohydrates should be major components of the diet, as they support recovery and the higher intensity part of training. The exact amount of carbohydrates you need to take in depends on the training. If the training uses more muscle and liver glycogen, your carbohydrate intake should be increased accordingly.

# FUELING RECOVERY

## RECOVERY

Recovery is an extremely important part of the training process. In fact, this is the period in which the body adapts and improves. Training is just the stimulus to start the process. Nutrition plays an important role here too. If we need to recover quickly before the next training session or race, carbohydrates are the most important ingredients, closely followed by water. If we are looking to improve over time and increase the building of new proteins (protein synthesis to support new and improved muscle), protein is the most important ingredient. Proteins are essential for repair and adaptation. High quality proteins that contain all of the amino acids (the building blocks to make proteins) are best at increasing the synthesis of proteins. Studies have shown that 20-25 grams of high quality protein within 1 hour after exercise and at regular intervals (every 3 hours during the day) should result in optimal protein synthesis. In the long run this would support the adaptations!

## GOOD PROTEIN SOURCES

- whey protein - milk - meat - poultry - fish - beans

## SUMMARY

So the most common nutrition issues in triathlons are:

1. Running out of energy
2. Becoming dehydrated
3. Gastrointestinal problems

All of these issues can be avoided or reduced by putting in place a good nutrition strategy for your race.

1. Drink 30-40 grams of carbohydrates per hour
2. Adjust fluid intake to prevent weight loss (do not lose more than 2% body weight gain)
3. In order to prevent gastro-intestinal problems reduce fibre intake before and during the race as well as to eat protein meals. When using highly concentrated carbohydrate sources, make sure you drink sufficient water.
4. Train with your race nutrition plan.

## TOP TIPS

- Don't experiment with new products on race day
- Use the same nutrition products for at least 1 week prior to the race
- Don't be afraid to train to your gut and even fuels are not emptying from your stomach reduce the intensity temporarily. You will benefit from the race in the race
- Hydration during the race is important, but make also sure you don't drink too much
- ingest 20-25 grams of protein in the hour after last training and at regular (2h) intervals during the day
- Don't just breakfast on race day, well in advance and make sure it is available for you on race day. Don't eat down to get breakfast a week or two day without checking