

## CARBOHYDRATES IN SPORTS

There are several different types of carbohydrates, and each one has its own specific characteristics. Biochemically speaking, we are used to divide between **simple** and **complex carbohydrates**, as to say carbohydrates composed by one/two or more molecules.

However, this distinction is only important biochemically and doesn't relate to the **effects that carbohydrates have on the body**.

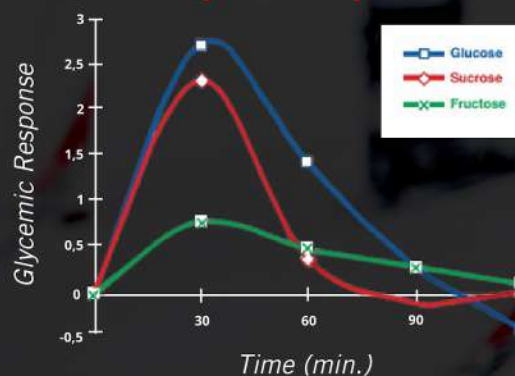
To define these, we need to consider carbohydrates **glycemic index**.

### GLYCEMIC INDEX

The glycemic index (GI) is a way of **ranking** carbohydrate-containing foods based on how slowly or quickly they are digested and **increase blood sugar levels** over a period of time – usually 2 hours.

Foods with a **lower GI** will have a **slower digestion rate** and will lead to a **limited blood sugar increase**. A **higher GI** food instead, would lead to a faster rate of digestion and absorption, thus, a **quicker rise in blood glucose levels**.

### Glycemic Response



**Figure 1** - The diagram shows the increase of blood sugar (mmol/L) in time (minutes), after taking 50 g of glucose (blue line), sucrose (red line) and fructose (green line).

The glycemic index of a food is affected by the type of carbohydrate it contains and also by other factors:

- **Cooking method** (puffed rice has a higher glycemic index than boiled rice, raw carrots have a lower glycemic index than cooked carrots);
- **Meal composition** (presence of fats and proteins in a food slows down digestion);
- **Presence of fibres** (water soluble fibres slow down glucose absorption in the gut and can maintain stable blood sugar levels for longer periods).

**Table 1**

GLYCEMIC INDEX RANKING	
Very low:	lower than <b>40</b>
Low:	between <b>40</b> and <b>55</b>
Medium:	between <b>56</b> and <b>69</b>
High:	higher than <b>70</b>

GLYCEMIC INDEX VALUES (REFERENCE FOOD GLUCOSE)	
broccoli, courgettes, fennels, salad, spinaches	15
soybean	18
white yogurt	19
fructose	23
cherries	23
pearl barley	23
legumes	30
apricots	32
skimmed milk	34
pears	38
apples	39
ravioli	41
peaches	44
oranges	46
grapes	48
peas	49
chocolate	51
orange juice	54
bananas	56
pasta	57
tea biscuits	58
boiled potatoes	59
white rice	60
ice cream	63
short pastry biscuits	66
sugar	67
gnocchi	69
wheat white bread	73
honey	76
fried potatoes	78
cream wafer cookies	80
roast potatoes	88
glucose	100



## CARBOHYDRATES IN SPORTS

Based on this evidence, it is possible to realize the importance of glycemic index in the nutrition of athletes, not only to produce beneficial effects on weight and body composition, but also to **achieve a better modulation of energy metabolism during performance**.

### EACH SITUATION HAS ITS GLYCEMIC INDEX

#### **“So which carbohydrates should I include in my nutrition strategy?”**

The correct answer here should be **“it depends”**. It depends as in reality every situation, in everyday life as in training or in sport competition has its specific needs.

In **everyday life**, it would be better **to avoid overusing high GI carbohydrates**.

Ideally, one should start each meal with plenty of vegetables, as the fibre in them slows the absorption of the carbohydrates in the food consumed subsequently, or choose cooking methods that allow to keep the food GI low.

In the final hours **before exercising**, it would be better **to opt for low GI carbs** such as fructose or isomaltulose. This is because low glycemic index foods, in particular before competitions or training sessions, can promote the burning of fats during physical exercise thereby inducing **glycogen saving**. In this way one will be able to build up a **carbohydrate reserve** to be used during the exercise.

**High GI carbohydrates** are the best ones **during** and **after** the **exercise**.

High GI carbohydrates are very useful because they are absorbed quickly, making them available to the muscles as soon as they reach the blood. This makes them perfect to be used to sustain prolonged efforts, limiting any drop in the performance.

Immediately **after exercise**, especially if it lasted longer than 90 minutes, one should consume **high GI carbohydrates** that are digested and absorbed rapidly, in order to replenish the muscle and liver glycogen reserve. If one is training frequently, a maltodextrin mix might be optimal to benefit from the speed with which such carbohydrates reach the bloodstream.

### CARBOHYDRATES PER HOUR

The quality of carbohydrates is not the only factor to consider. To build an optimal nutrition strategy, **quantity** must also be taken into account.



## CARBOHYDRATES IN SPORTS

***“A higher carbohydrate generally results in better performance but ingesting too much may cause stomach discomfort and this can have a negative effect on performance.”***

To improve the sport performance, it is crucial to **manage the carbohydrate intake.**

Over time, things have undoubtedly changed when it comes to sport nutrition. We used to refer to mileage or elevation change to determine when to take products but now science has instead shown us how important it is to take the **right amount of carbohydrates for each hour of exercise.**

The first concept one must learn then, is that, during physical exercise, the gut can **absorb** a maximum of about **60g of carbs per hours.**

More than this is largely impossible as the transporters of glucose through the intestines become saturated if they absorb more than 60g of glucose or maltodextrin per hour. For example when 100 grams of carbohydrate are ingested per hour, only 50-60 grams are used as a fuel by the muscle.

Still, in races lasting **longer than 2.5 - 3 hours** it might be necessary to consume up to **90g of carbohydrates per hour.** In these cases, the only way to use more than 60g of carbs/hour is to consume a **combination of two different carbohydrates.** Ideally 60g of carb/hour from **glucose or maltodextrin** and 20-40g/hour from **fructose.** The latter uses different intestinal transporters to glucose, thus increasing the amount of carbohydrates that can be transported from the intestine to the blood.

***“In other words: when more than 60 grams of carbohydrate is ingested, a combination of glucose and fructose or maltodextrins and fructose can increase the oxidation of that carbohydrate.”***

### CONCLUSION

To best build your energy strategy, you need to consider both the **quality and quantity of carbohydrates.** The quality is influenced by the **glycemic index** of the carbohydrates we ingest.



# CARBOHYDRATES IN SPORTS

Carbohydrates with a **lower glycemic index** are more suitable if consumed **before** physical exercise as they provide a slower and longer release of energy over time. Carbohydrates with a **high glycemic index**, on the other hand, are more suitable for the **during** phase, to have a quick energy support, and for the **after**, to quickly recover the glycogen stores.

The **quantity** of carbohydrates, instead, is defined on the basis of the **duration** of physical exertion:

- **30g/h** for activities lasting **1-2 hours**
- **60g/h** for activities between **2** and **3 hours**
- **90g/h** for activities lasting more than **3 hours** (Maltodextrin or Glucose + Fructose)

## BUILDING UP AN ENERGY STRATEGY

<b>BEFORE</b>	<b>LOW GI CARBS: Isomaltulose, Fructose</b>	<i>Promote fat burning inducing glycogen saving. Energy is released more slowly during a longer period of time</i>
<b>DURING</b>	<b>HIGH GI CARBS: Glucose, Maltodextrin</b>	<i>Quickly absorbed. Provide fast energy to the muscles and replenish glycogen stores after exercise</i>
<b>AFTER</b>		
<b>Effort &lt; 2h: up to 30g/h of carbs</b>		<b>Effort &gt; 2h: 60g/h of carbs</b>
		<b>Effort &gt; 3h: 90g/h of carbs</b>

Remember to test your nutrition strategy before using it during a race

## OUR SUGGESTIONS

### Pre sport

Pre Sport is the highly technical energy supplement based on a concentrate of different carbohydrate sources and enriched with isomaltulose. To be taken before exercise.



<b>Carbohydrates</b>	<b>Vitamin</b>	<b>Gluten Free</b>	<b>25g Carbs</b>
Fructose Isomaltulose Glucose	Vitamin B1		



# CARBOHYDRATES IN SPORTS

## Isocarb 2:1

The Enervit Isocarb 2:1 exclusive carbo-mix ( 2/3 parts of Maltodextrin AGENANOVA and 1/3 of Fructose) allows to take up to 90g of carbohydrates/h.



### Carbohydrates

- Maltodextrin-Fructose 2:1 ratio
- 1 scoop in 500ml of water = 30g carbs
  - 2 scoops in 500ml of water = 60g carbs
  - 3 scoops in 750ml of water = 90g carbs

### Vitamin

Vitamin B1



## Enervit Gel

Enervit gel is an energy product It's designed to help when the effort gets intense thanks to its DP4 formula, based on carbohydrates combined with 4 glucose units.

20g Carbs

### Carbohydrates

- Glucose
- Maltodextrin
- Fructose

### Vitamin mix

- Vitamin B1
- Niacin
- Vitamin B6

Gluten Free

## Isotonic gel

Enervit Isotonic gel is an energy product based on maltodextrin and vitamins, indicated in case of intense and prolonged effort. The isotonic formula makes it suitable even for the most sensitive athletes.



### Carbohydrates

Maltodextrin

### Vitamin mix

- Vitamin B1
- Niacin
- Vitamin B6

Gluten Free

20g Carbs



# CARBOHYDRATES IN SPORTS

## Liquid gel

Enervit Liquid Gel is an energy gel that has an innovative carbomix of maltodextrin and fructose in a 2:1 ratio, which contains both a low concentration of carbohydrates and simple sugars.



### Carbohydrates

Maltodextrin-Fructose 2:1 ratio

### Vitamin

Vitamin B1

30g Carbs



## Competition Bar

Competition Bar with its formula, based on glucose-fructose syrup, rice flakes, oats and maltodextrin, is designed to provide you with 22g of carbohydrates per 30g bar. With its low fat content, it's a guaranteed carbo boost.

22g Carbs

### Carbohydrates

- Maltodextrins
- Glucose
- Fructose

### Low Fat

### Vitamin mix

- Vitamin B6
- Thiamin

### Gluten Free

## Power Crunchy Bar

Enervit Power Crunchy, with its 23 g of carbohydrates, 19% protein and with the addition of magnesium provides your body with the valuable nutrients it needs in training and races.



### Carbohydrates

- Maltodextrins
- Glucose
- Fructose

### Vitamin

Vitamin B1

23g Carbs



## CARBOHYDRATES IN SPORTS



### WP Recovery Drink

WP Recovery Drink, taken within 30 minutes of the end of the exercise, with its formula based on high quality carbohydrates and whey proteins is the ideal ally for your muscle recovery.

#### Carbohydrates

Maltodextrins

#### Proteins

10,5g of Whey Proteins

#### Vitamin mix

Vitamin C  
Vitamin E  
Niacine  
Vitamin B6  
Riboflavin  
Thiamin