

1 INTRODUCTION

Triathlon is a challenging sport for many reasons. It combines three disciplines and thus requires not only training for swimming, cycling and running but also requires being able to cope with the transitions. Especially at the long distances, nutrition can be critically important. Not only can it be the difference between first and second place, but it can also be the difference between finishing and not finishing. It is for this reason that nutrition is often called the fourth discipline of triathlon.

In order to have a great race it is important to be optimally prepared for the swim, the bike and the run. Nutritional preparation should play an important role too. A good understanding of the effects of nutrition on performance is important to make the right nutrition choices, both in training in the months leading up to a race, as well as in the race itself.

In order to support your physical and mental commitment as well as your health, Enervit has developed this nutritional guide. It will help you to make the right nutrition choices to get the most out of your training and to optimise your race performance.



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2 NUTRITION IN SPORT: THREE FUNDAMENTAL PILLARS

Sports nutrition has three main pillars:

FUEL, HYDRATION, REPAIRING, REBUILDING AND ADAPTATION. Each pillar is essential.

Each pillar is important! Let's study them a little closer:

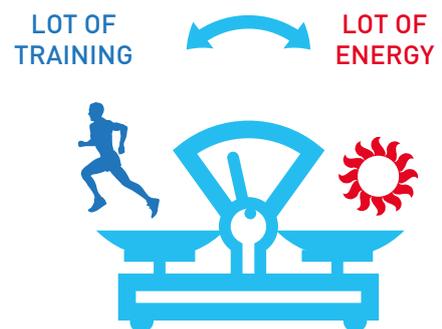


3 ENERGY

When you train a lot, you also need a lot of energy. Energy is needed to support training as well as racing. Generally, on longer and harder training days energy expenditure is greater and fueling will be more important. During rest days, active recovery and even shorter training of lower intensity, energy expenditure will be low and there is no need to actively refuel. It is important that energy balance is maintained over a number of consecutive days.

IN SUMMARY:

proper fuelling is about covering average energy expenditure and not necessarily about perfectly balancing intake and use in a single day.

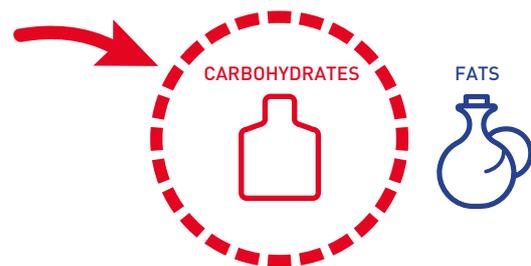


3.1 ENERGY SOURCES: CARBOHYDRATE

The energy for triathlon consists essentially of two sources: carbohydrates and fats. **Carbohydrate and fat are both important fuels but they provide energy at different rates.** Because carbohydrate can provide energy faster, this is the better fuel for higher intensity exercise. If carbohydrate stores are depleted it is not possible to support exercise at higher intensities. This is why carbohydrate in the diet is important and we must make sure daily intake through the diet is adequate.

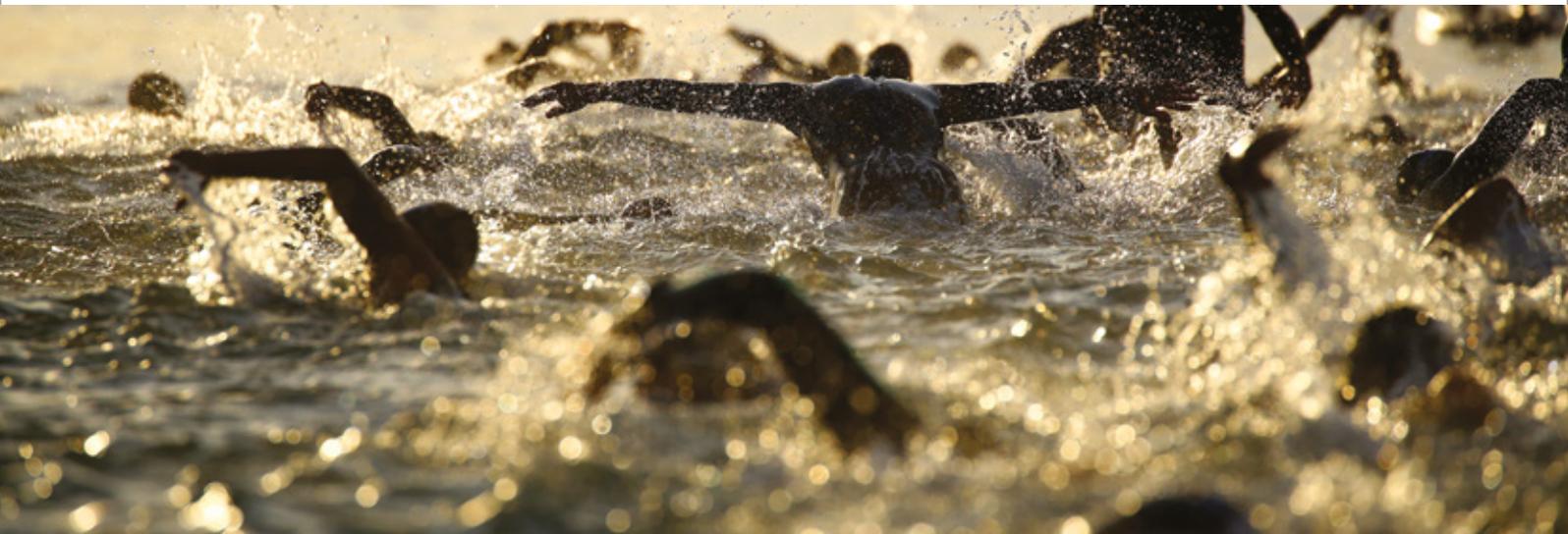
What is adequate depends on daily use. If training is longer and harder more carbohydrate is required to maintain carbohydrate stores. For fats, there's no problem, as your body contains plentiful supplies. Try to make sure your daily diet only includes high quality fats, like extra-virgin olive oil.

Omega-3 fatty acids are also important, but more about that a little later.



3.2 THE CRITICAL ROLE OF CARBOHYDRATE

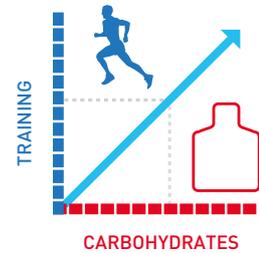
It is not possible to give one general guideline for carbohydrate intake that will work for everyone in all situations. Carbohydrate intake needs vary depending on the level of athlete, the duration and the intensity of training.



1 1. The longer and harder you train, especially if you train twice a day, the more carbohydrate you will need to ingest whilst exercising. This depends on the goal. If my goal is to train fat burning, I don't want more carbs. If my goal is to train with a lot of quality, this is correct.

2 Our bodies have an impressive but not limitless ability to deliver ingested carbohydrates to the muscle. For most training situations you should aim to deliver between **30 and 60 grams of carbohydrate per hour**. For longer (>3h) and harder workouts consider aiming for 90g/h. If you ingested more than 60 g/h, make sure this is a combination of glucose polymers (maltodextrin and starch: 60g/h) plus fructose (30g/h) for a total of 90 g carbohydrate per hour. If you have experienced any gastro-intestinal problems in the previous training sessions or races, it is best to ingest no more than 60 - 75 g of carbohydrates per hour.

3 While carbohydrate intake during exercise can help completing your training session as planned, during **lower intensity workouts** (swimming, cycling or running), a small amount of carbohydrate is sufficient. When you are **working harder** and longer you may **use up your entire carbohydrate stores** even when you are ingesting carbohydrate. It is more important in these workouts to optimise carbohydrate intake.



GLUCOSE

60g/1h

FRUCTOSE

30g/1h



IN SUMMARY:

if the duration and intensity of your exercise increases, so does the amount of carbohydrate you need to ingest. You can do this before exercise and also during exercise.

During exercise, carbohydrate intake may vary from 30g/h up to 90g/h as duration (and intensity) increases.



You should consider the following:

- A. LOW INTAKE:** about **30 g of carbohydrate** per hour of exercise, for sessions of 1 to 2 hours.
- B. MODERATE INTAKE:** about **60 g of carbohydrate** per hour of exercise, for sessions of 2 to 3 hours.
- C. HIGH INTAKE:** about **90 grams of carbohydrate** for sessions longer than 3h. This intake should be glucose (glucose polymers, starch; 60g/h) and fructose (30 g/h).

Of course, the practicalities of this are different during swimming, cycling and running. This is why it helps to have a range of products, so you can work out what is most convenient for you.

Focusing on supplements, give the following options some thought:

- A. LOW INTAKE:** for each hour of exercise choose between:
 - 1) 1 bottle of water (500ml) with 2 scoops of **Enervit Sport Isotonic Drink**
 - 2) 1 bottle of water (500ml) with 1 scoop of **Enervit Sport Isotonic Drink** + 1 **Enervit Sport Competition Bar**
 - 3) 1 **Enervit Sport Liquid Gel** or **Enervit Sport Liquid Gel Competition** with caffeine



- B. MODERATE INTAKE:** for each hour of exercise choose between:
 - 1) 2 bottles of water (2 x 500ml) with 2 scoops of **Enervit Sport Isotonic Drink**
 - 2) 1 bottle of water (500ml) with 2 scoops of **Enervit Sport Isotonic Drink** + 1 **Enervit Sport Competition Bar**
 - 3) 2 **Enervit Sport Liquid Gel** or **Enervit Sport Liquid Gel Competition** with caffeine



- C. HIGH INTAKE:** for each hour of exercise choose between:
 - 1) 1 bottle of water (500ml) with 2 scoops of **Enervit Sport Isotonic Drink** + 1 **Enervit Sport Liquid Gel Competition** + 1 **Enervit Sport Liquid Gel**
 - 2) 1 bottle of water (500ml) with 2 scoops of **Enervit Sport Isotonic Drink** + 1 **Enervit Sport Liquid Gel Competition** + 2 **Enervit Sport Gels**



4 RECOVERY: REPAIRING, REBUILDING AND MUSCLE ADAPTATION

Proteins are made up of amino acids and adequate intake is important for all athletes. Protein has a number of fundamental functions that are particularly important in sport:

- 1 **Repair muscle protein** and other tissue damaged by exercise.
- 2 **Reshape the protein in muscles**, tendons, ligaments and bones to adapt them better to exercise.
- 3 **Build fat free mass** especially **muscle mass**.

Many athletes do not realise that :

1. the metabolic stimulus from training lasts for many hours after exercise;
2. proteins are not stored in our bodies, making it best to consume them at regular 3-4h intervals.

What is important is that you have a high quality protein with all the amino acids, 8 grams of essential amino acids and 2-3g of leucine. Monitor the intake of protein in each of your meals and make sure there is at least 0.25-0.30 grams of protein per kg body weight every 3-4 hours. The number of meals and the exact timing of meals is usually dependent on your training and can be different if you train in the morning, afternoon or evening. Generally, it is recommended to have 4-5 meals per day, 3-4 hours apart. It is a good idea to get into the habit of having a protein containing meal as soon as possible after training, even if you are not particularly hungry. It is not all about protein of course.

After training or racing, a meal should also contain carbohydrate to replenish energy reserves before the next session. If you want a drink that contains carbohydrates and the key amino acids then opt for **Enervit Sport Recovery Drink**. This drink is easy to prepare and easy to drink **within 30 min after finishing your session**. It has the bonus of replenishing some of the mineral salts you lost as well.



5 HYDRATION

Hydration has long been known to be a key factor to performance in sport in general. In triathlons, especially those in hot conditions, hydration is even more important.

5.1 HYDRATION AND SPORTING PERFORMANCE

Becoming dehydrated causes a series of disruptive changes that may impact two important processes:

- 1 **central nervous system functions**, leading to central fatigue;
- 2 **cardiovascular functions**, with less oxygen reaching the muscles, less aerobic metabolism and increased peripheral fatigue.

Dehydration also **increases muscle temperature**, causes a decrease in the contraction capacity of the muscles and alterations in the transmission of the impulse from neurons to the muscle.

Different athletes will sweat at different rates and sweat rate depends on several factors, including: environmental conditions (heat and humidity especially), acclimatization, the genetics of the individual athlete and, of course, the intensity of the exercise. Total sweat losses will also depend on the duration of exercise.

It is important to have a hydration plan that is personalized to you and your race (or training). As the environmental conditions change, your plan will have to be adapted. As a very rough guideline, **you could ingest about 400-800 ml of water every hour**, preferably by drinking it little by little. In case of heavy sweating, however, this quantity could be insufficient.

It is common practice to use the reduction in body weight after exercise as an indicator of dehydration. Weight loss up to **2%** of the pre-exercise weight (in a well-hydrated athlete) is unlikely to produce any unfavorable physiological effects. In colder conditions it is possible that even larger losses might be tolerated (i.e. 3%), but in hot and humid conditions fluid losses should be relatively small. Some weight loss is allowed, weight gain should of course be avoided and would be a sign of overdrinking.



It is of course important that you start your training sessions and competitions in conditions of normal hydration. Being dehydrated at the start may immediately put you at a disadvantage. Sweating also results in the loss of mineral salts, especially sodium, so these need to be replaced.

For races as well as training you should consider using **Enervit Sport Isotonic Drink** were especially designed for this purpose. For IRONMAN® and IRONMAN 70.3® distances we suggest also **Enervit Salt Caps**, containing mainly sodium salts.



Remember: hydrate constantly and avoid drinking too much liquid at any one time.

6 DIETARY SUPPLEMENTS

In addition to a normal healthy well-balanced diet, supplements such as carbohydrates, protein, mineral salts can support your performance. Also **caffeine, cocoa flavanols and omega-3 fatty acids** may be considered.



6.1 CAFFEINE

It has long been known that caffeine, contained in coffee, in other beverages and in specific sports products, is effective in increasing endurance skills. For example, the European Food Safety Authority (EFSA) has recognized that **caffeine, taken about 1 hour before exercise at a dose of 3 mg/kg of body weight, reduces the perception of effort (RPE) and improves time to exhaustion (endurance capacity)**. Caffeine is one of the most studied ergogenic aids that is worth experimenting with, provided that you respect certain rules.



- **You should not consume more than 3 mg per kg of your body weight** (studies also show more has no additional effect).
- **Try out caffeine in training first.** If you experience unwanted side effects such as anxiety, acceleration of the heartbeat, headaches, dizziness, nausea and other gastro-intestinal disorders lower the dose.
- **In a longer event,** you might choose not to consume caffeine before the start and wait until **40-60 min before the section of the race you are likely to struggle with the most and/or that is most critical for your overall result.**

In such strategy you should consider **Enervit Sport Mate Shot**, which is a small bottle of Mate with 180 mg of natural caffeine. It provides a practical boost that you can consume even in the most hectic moments of a race.



6.2 COCOA FLAVANOLS

Polyphenols are a large family of substances found in plant foods that have been linked to a wide array of health benefits. Among the polyphenols, the flavanols extracted from cocoa beans have gained particular interest, because of **their ability to dilate blood vessels in the muscles which could help with the delivery of nutrients and the removal of metabolites, produced by muscle contraction.** In addition to these effects, cocoa flavanols have also been linked to improved energy metabolism during exercise. In order to obtain these effects, the amount of flavanols you should take is beyond the amounts you may find in chocolate. Enervit offers you two options: **Enervit Sport Carbo Flow** and **Enervit Sport Just Flow**. If in addition to cocoa flavanols, you also want the low glycemic index carbohydrates (isomaltulose), choose Enervit Carbo Flow. If you prefer to take only the cocoa flavanols, opt for Enervit Just Flow.



To learn more, go to www.enervit.com, the website dedicated to Sports in Science.



63 OMEGA-3 FATTY ACIDS

Omega-3 fatty acids are **essential fats (the body can't make these fatty acids and we need to rely on dietary intake) that may have benefits both from a health and a sports performance point of view**. During training, omega 3 fatty acids are also used as a fuel and thus for athletes omega-3-fatty acid requirements are higher. Consequently eating fatty fish (salmon, mackerel) regularly is important. Very few people, however eat enough fish and thus a supplement with omega-3 fatty acids is a good alternative. To ensure you get enough high-quality omega-3 fatty acids on a daily basis Enervit has created **Enerzona Omega3 RX**, an omega-3 supplement with 5 stars from IFOS (the International Fish Oil Standards Programme) which guarantees the omega-3 of the highest quality. It comes in an exclusive and patented no-flavor-leakage capsule.



7 SEARCHING FOR YOUR IDEAL WEIGHT HOW TO ACHIEVE THE BEST WEIGHT...

When you train less and on days when you don't train at all, you must ensure that the energy you ingest with food is lower than the energy you burn/consume during the day. But you already know that.

It is important to manage the weight loss carefully though as weight loss can have profound effects on performance and immune function. Your approach should be carefully weighed, otherwise dieting will do more harm than good. Make sure carbohydrate intake is adequate to support training and have a relatively high protein intake to feel satiated.

More can be found at www.enervit.com and www.enerzona.com



8 PREPARING FOR A RACE

A fundamental, physiological rule of exercise is: **the harder you are planning to race the more you will need to have carbohydrates available to produce energy.** In the days leading up to competition you need to take the appropriate steps to make sure you have enough carbohydrate available: the tank must be full. This will increase the chances of maintaining a high intensity all the way to the finish.

8.1 GLYCOGEN: YOUR CARBOHYDRATE STORES

- 1 **Muscle glycogen stores** are important for performance. By reducing training load the days before the race, you will minimise glycogen use and by eating carbohydrate rich foods, you will build up your stores.
- 2 **The glycogen stored** in the liver will provide glucose to the blood and serve to maintain a constant glucose supply to brain and muscle.



GLYCOGEN = ENERGY

8.2 HOW TO FILL UP GLYCOGEN STORES IN THE DAYS BEFORE A RACE

To fill your glycogen stores, the carbohydrate intake must exceed its use. Since your daily diet already contains carbohydrates, maintaining the same regime in conjunction with the sharp reduction of exercise performed in the days leading up to the race will already help to build your glycogen stores.

If you expect to perform a long race, with high energy expenditure, you should probably increase the intake of carbohydrates with your diet for 1, 2 or 3 days. Studies have shown that optimal glycogen



synthesis is obtained with very high carbohydrate intakes of 10 g/kg but such large quantities may not always be desired because you don't want to gain weight and also not necessary. In practice, you can consider 5-7 g of carbohydrates per kg per day: a generous but not extreme intake that will result in very high glycogen stores. 5 g/kg would be more appropriate if you are hardly doing any training and 7 g/kg when you are still training a little.

Here is an example of what you could do the days before the race to optimise glycogen reserves:

- 1 **Olympic Triathlon - 5150** (1500m + 40,000m + 10,000m): in the last day before the race, increase your usual intake and reduce a little proteins and vegetables;
- 2 **Ironman 70.3** - (1900m + 90.000m + 21000m): in the last 1-2 days before the race, increase your usual carbohydrate intake, keep same protein and reduce vegetables and fruit;
- 3 **Ironman** - (3800m + 180.000m + 42.195m): in the last 2-3 days before the race, increase your usual carbohydrate intake even further, keep same protein and reduce vegetables and fruit.

It is probably a good idea to spread the meals throughout the day to avoid extremely large meals. It is better to divide carbohydrate intake over 5-6 daily meals (3 main meals and 2-3 snacks) to avoid gastro-intestinal discomfort. Carbohydrate loading will mean that your weight will increase a bit as a result of stored glycogen weight plus the water it retains. Both the glycogen and the water released from it during the race will be useful to you in competitions of longer duration.

Pay attention:

The last larger meal should be something that is easily digested. For athletes who often experience gastro-intestinal problems, the day or days before the race it is important to reduce fiber intake and perhaps reduce the intake of dairy products.



Examples for a typical day:

- **Breakfast:**
2 scoops of **Enervit Sport Carbo Flow** dissolved in low-fat milk or warm water, and a slice of toast with a thin layer of jam.
- **Mid-morning snack:**
1 **Enervit Sport Performance Bar** (60 g).
- **Lunch:**
120 g of basmati rice with 90-120 g of white meat, to be dressed with extra-virgin olive oil, and a small portion of vegetables or a potato.
- **Mid-afternoon snack:**
1 **Enervit Sport Competition Bar** (60 g) or **Enervit Sport Crunchy Bar** (40 g).
- **Dinner:**
120 g of basmati rice with 90-120 g of white meat, to be dressed with extra-virgin olive oil.

Remember: everyone is slightly different and so every athlete has to develop his or her own pre-exercise routine that works.

8.3 HOW TO FILL UP YOUR GLYCOGEN RESERVES THE MORNING OF THE RACE

Depending on how long it takes you to digest your food, what foods you like and your general habits, our experience has led us to recommend the following breakfast options on race morning. Remember to eat suitable far ahead of the race so that your stomach will not feel full at the start of the race. This probably means that you should **have breakfast about 3 hours before the race start**. For shorter races and smaller breakfasts this can be reduced to 2 hours. Note: on race day you are likely to be more nervous and it may be harder to eat and digest the foods than normal.

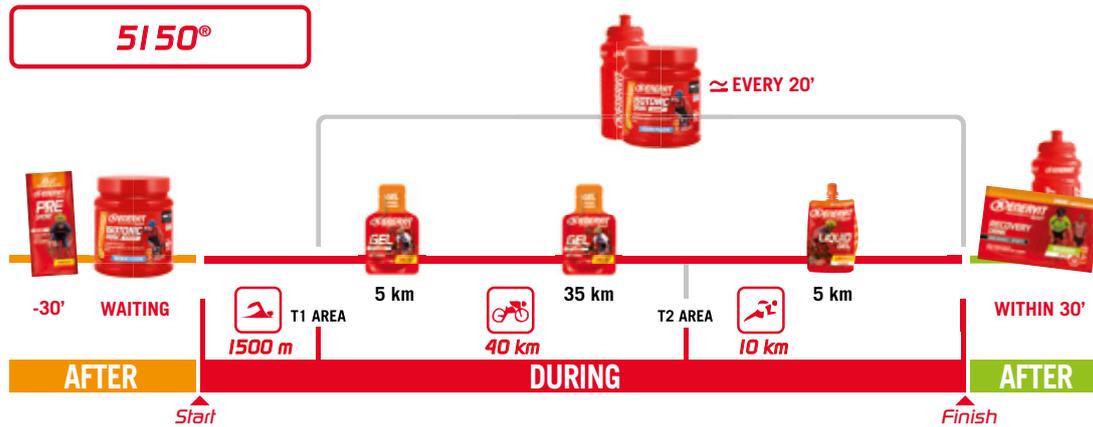
- 1-2 scoops of **Enervit Sport Carbo Flow** with lukewarm water, 1 slice of toast with a thin layer of jam;
- Plain low fat yogurt with 1 scoop of **Enervit Sport Carbo Flow** and oatmeal with dried fruit or muesli;
- Rice, soy or oat milk with oatmeal and dried fruit or muesli;
- Toast with jam and dried fruit, fluids for hydration.

Between breakfast and the start, while you are preparing your kit and heading to the start line, have **Enervit Pre Sport** (or **Enervit Power Sport Competition Bar**, if you prefer something solid) and keep hydrated by sipping **Enervit Sport Isotonic Drink** diluted in water.



10 ENERVIT PERFORMANCE STRATEGY

Enervit Sport is **the complete product range for every dietary supplement need** and has something to aid your sporting strategy, every step of the way: before a race, to increase your energy reserves, during to combat fatigue and after to optimise and speed up recovery. **HYDRATION** and **ENERGY** should be seen as your allies when taking on an ironman. They literally swim, bike and run with you. When properly managed, they will help to prevent tiredness and help to maintain a high intensity.



11 POST-RACE AND POST-TRAINING RECOVERY

After strenuous exercise (race or training), your nutritional decisions must help to return to normal, restore optimal muscle function and replenish your energy reserves so you are ready for the next session. Such choices help you to benefit from all the effort in training and racing (racing should be approached as a high quality training). The key points are:

- 1 hydration;
- 2 protein and carbohydrate intake.

For **hydration**, remember the ideal amount of **water** to drink in the hours after exercise is 900-1350 ml per kg body weight lost during exercise. So if you have lost 2 kg fluid intake should be around 1800-2700ml over a period of 4-6 hours post exercise.

Protein intake should be **0.25-0.30 g/kg per meal. Meals should be 3-4 hours apart.**

If you have depleted your glycogen stores, you should aim to have **carbohydrate** intake of 1.2 g/kg of body weight per hour for at least 2 hours after exercise.

Besides nutrition, rest and sleep are critical. They are an integral part of training and play a fundamental role in recovery and improving performance. Finally when speed of recovery is important, but perhaps you don't feel like eating or preparing a meal, you can always use **Enervit Sport Recovery Drink**, which contains carbohydrate, branched chain amino acids, minerals, salts and vitamins. This is the next step towards your next commitment.



**WITHIN 30'
FROM THE END
OF THE EFFORT**

