

## Workout Nutrition

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**Abstract:** *The intake of nutrients before, during and after workout is critical for anyone who follows a bodybuilding training programe. It is presened the pre-workout and post-workout recommended meals by explaining the amount of nutrients and the proper timing required for an optimum muscle recovery and growth. It is shown how the nutrients varies depending on the intensity and length of the training that follows or depending of the meals frequency. Examples of pre-workout and post-workout meals and snacks are given.*

**Keywords:** *nutrition, pre-workout, post-workout, bodybuilding.*

### 1. Nutrition in bodybuilding

Nutrition is one of the most important factors in bodybuilding and must be taken into account in any plan which aims to increase the performance of a training athlete. The purpose of nutrition is to provide a steady stream of energy for muscle during training and to ensure a fast recovery of muscles without injury.

Without an optimal nutritional strategy, the body's response to the stimulus represented by the training will not be the one desired. Nutrition and training are very important factors which should complement each other and should not be treated separately. Both the food taken by an athlete, and the effort during training are part of a training program.

The nutrition of every athlete should be established according to the followed workout, but to maximize muscle growth there are rules for pre-workout and post-workout nutrition, which apply regardless of the established training.

For maximum workout yield, pre-workout and post-workout nutrition should provide the optimum amount of nutrients to the body at the right time. There is a four hour window of opportunity, divided in 90 minutes before workout, 60 minutes workout and 90 minutes after workout, which is very important in term of muscle repair and growth. In a meal is taken 90 minutes before workout, the body has time to digest the food and the muscles will have energy during training. The post-workout meal is the most important because it helps to restore the body after training and builds muscle [7].

Assuming that training starts at 08:30, the nutrition plan should look as follows:

**Table 1.** Sample nutrition plan for a 08:30 workout

Time	Description
7 <sup>00</sup>	Pre-workout meal
8 <sup>00</sup>	Snack
8 <sup>30</sup> – 9 <sup>30</sup>	Workout
9 <sup>30</sup> – 10 <sup>00</sup>	Post- workout meal
11 <sup>00</sup>	Next meal

The presented four hours period is very important for muscle growth. During this time the body is very receptive to recruit and build new muscle fibers [5].

## **2. Pre-workout nutrition**

The pre-workout meal is the second most important meal of the day, after the post-workout meal. It aims to provide the body the energy needed during training.

An effective meal before training must take into account the carbohydrates type. Carbohydrates with a low glycemic index, complex carbohydrates, are recommended because it provides a steady flow of energy for the body. Carbohydrates with a high glycemic index, simple carbohydrates, are rapidly released into the blood stream and lead to the release of large amounts of insulin to balance blood sugar concentration. This leads to a rapid increase in energy, followed by a rapid decline and thus leaving the body tired and weak during training.

Pre-workout meal should be consumed approximately 60 to 90 minutes before workout to allow the body to digest the food and to make the necessary nutrients the body needs during training. A snack based on simple carbohydrates such as fruit or fruit juice could be served with 15-30 minutes before training to provide the body with an immediate source of energy.

Pre-workout sample meals or snacks:

- cereals with skim milk;
- whole bread with peanut butter;
- fruit juice;
- chicken breast with whole bread;
- yogurt with fruits such as sliced bananas and/or strawberries;
- grilled chicken with pasta;
- steamed non-gaseous vegetables;
- fruit salad.

These foods can be combined to create a complete meal, such as a bowl of milk with cereals, bread with peanut butter and a glass of fruit juice.

## **3. Post-workout nutrition**

A strength or resistance training is a significant physiological stress for the body. Perceived symptoms of this stress include muscle pain, the need for extra sleep and an increased appetite. Stress induced by training cause microlesions in the muscle fibers felt as muscle pain; also it will force the body to adapt to better withstand subsequent similar stress, by increasing the volume and quality of muscle fibers.

In [2] is shown that strength training cannot be sustained whether muscle glycogen reserves are exhausted. At the same time is demonstrated the existence of a direct link between fatigue and limited reserves of muscle glycogen. Therefore post-workout meal is very important to quickly restored glycogen reserves, to stop muscle breakdown and to initiate protein synthesis and beginning muscle recovery after effort.

Post-workout meal should contain carbohydrates and proteins and be designed to supply proper nutrients to the muscles as soon as possible. It is recommended that post-workout meal to be taken immediately after training or in the first 30 minutes. Fats should be avoided during this time because it slows the digestion of food by increasing transit time through the stomach and thus nutrient absorption is delayed.

Carbohydrates are used to replenish muscle glycogen stores. Otherwise, the body will have to breakdown the protein to obtain glycogen. Immediately after workout the body needs simple carbohydrates, with a high glycemic index, to quickly release a substantial amount of insulin, insulin spike, which will bring nutrients to muscles quicker. Simple carbohydrates are recommended over the complex ones because the latter contains fiber which slows digestion and increase the absorption time of nutrients needed for recovery and muscle growth.

The post-workout meal should contain between 0.5-0.8 grams of carbohydrate per kg of body weight. If the training was long and very intense, the amount of carbohydrates should be increased at 0.8 - 1.2 grams per kg of body weight [4]. However, should be taken into account not to eat excess carbohydrates, because the excess will be converted into body fat.

If the consumption of carbohydrates takes place at frequent intervals such as every 15 to 30 minutes and in large quantities it has been shown that the rate of glycogen storage is about 30% higher than when the carbohydrate supplementation is taken after 2 hours [2]. In the case of frequent consumption intervals, the optimal amount of carbohydrates is 1.2 grams of carbohydrates per kg of body weight per hour.

As important as the replenishment of muscle glycogen after exercise, the timing of protein supplementation to boost muscular recovery process is critical. After training the body slows down protein synthesis rate and increases the rate of protein breakdown; to reverse this trend protein consumption have a major role in the post-workout meal. In [2] is shown that adding protein to carbohydrate consumption after training improves aerobic endurance and limits training-induced muscle degradation. In [5] the recommended intake of protein is 0.3 - 0.5 grams per kg of body weight per hour immediately after exercise.

Although the consumption of carbohydrates and the intake of protein limits the amount of degradation and stimulates muscle protein synthesis, it was shown that by combining intake of carbohydrates with protein is obtained an additive effect. Combined intake of carbohydrates and protein increases the rate of glycogen storage by 38% in first 4 hours after exercise. When post-workout meal contains both carbohydrates and proteins the recommended consumption is 0.8 grams of carbohydrates per kg of bodyweight and 0.2 grams of protein per kg of body weight immediately and 2 hours after exercise [2].

Example of post-workout replenishing meals:

- one or two poached eggs on whole-wheat toast;
- tuna, vegetables and brown rice;
- whole pastas with chicken breast, broccoli and eggplant;
- cereals with milk and fruits such as sliced bananas;
- salmon, spinach and sweet potatoes;
- chicken breast with mixed vegetables.

#### **4. Conclusions**

The intake of nutrients before, during and after training affect the adaptations that occur in response to stimulus produced by training. For rapid recovery after training is very important to replenish muscle glycogen stores and to initialize the process of adaptation and recovery of muscle tissue. To quickly restore glycogen reserves, it is important to consume carbohydrates immediately after a workout.

It is recommended the intake of 0.8-1.2 grams of carbohydrates per kg of body weight per hour every 30 minutes within two hours after workout. The efficiency of the replenishment of muscle glycogen can be significantly increased if the consumption of carbohydrates is combined with proteins. Combining carbohydrates with proteins in the post-workout meal has the advantage of limiting muscle damage after exercise and accelerate the

accumulation of proteins.

### References

- [1] P. Holford, *New optimum nutrition bible*, Piatkus Books Ltd, London, 2004
- [2] J. L. Ivy, „Regulation of muscle glycogen repletion, muscle protein synthesis and repair following exercise,” *Journal of Sports Science and Medicine*, 2004, Vol. 3, No. 3, pp. 131-138.
- [3] <http://www.thinkmuscle.com/articles/haycock/hsn-01.htm>
- [4] <http://www.bodybuilding.com/fun/berardi4.htm>
- [5] [http://www.intense-workout.com/post\\_workout.html](http://www.intense-workout.com/post_workout.html)
- [6] <http://www.informaworld.com/smpp/section?content=a791675702&fulltext=713240928>
- [7] <http://www.gain-weight-muscle-fast.com/post-workout-nutrition.html>

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