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EDER HEALTH NUTRITION

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THE IMPORTANCE OF A PROTEIN RICH READY FOR USE DRINK FOR SPORTS NUTRITION.

Introduction:

Protein rich drinks for sports nutrition are well established in Germany. Products with easily digestible milk protein are in use since more than 20 years. A typical ready to use product contains 500 ml fluid with about 40 grams of protein, 50-100 g of different carbohydrates and some grams of fat as vegetable oil.

The protein component:

In central Europe most products contain milk proteins as protein source. The composition of the different milk proteins is similar to that of natural milk and shows a biological value of 88 to 90 (measured in the European scale for biological value with whole egg protein as standard = 100).

Elevating the content of lactalbumine could raise the b.v.. However lactalbumine is not stable during sterilisation and tends to form a viscous mass.
Milk protein is easily digestable and the amino acids of the protein are delivered to the body within less than 1 hour. In contrast to soy protein all amino acids are nearly 100% available to the body.

The amount of 40 grams of milk protein is the upper limit that can be directly utilized by the body from one portion. In case of more than 40g of protein the digestion may be not sufficiant to utilize the protein. Furtheron high amounts of protein are uneconomic because a substantial part of the protein is couverted to glucose in the liver.

In foreign countries there are many products based on soy proteins. Such products are not efficious for sports & nutrition:
The biological value of soy protein is about 45. Therefore nearly twice the amount of soy protein should be necessary compared to a good milk protein. The low biological value of soy protein is mainly caused by the low content of methionine plus low digestive availability of especially this amino acid: only 2/3 of the theoretically contained methionine in soy protein are available.

Furtheron soy contains natural substances which block the resorption of iron. Therefore soy makes the iron content of a whole meal unavailable. As sportsmen have a high demand for iron it cannot be recommended to use sports nutrition products containing soy flouer or soy protein.

The carbohydrate component

The main cabohydrate in sports nutrition is maltodextrin today. This is a partially digested maize starch with about 5 glucose units per molekule. Maltodextrin has some advantages compared to normal starch or glucose. It is readily water soluble, not sweet, stable during sterilisation and produces a much lower osmolarity compared to glucose or sugar. This makes isotonic drinks with high carbohydrate content possible.

The addition of carbohydrates is very important for a protein drink. The carbohydrates are necessary for an anabolic utilisation of a protein. The carbohydrate content should be about 150 % of the protein content, i.e. 60g of carbohydrate for 40 grams of protein.

The fat component

The addition of fat in a protein drink has two purposes: First a small amount of fat makes a better taste of the aroma. Secondly there is a nutritional purpose: Sportsmen try to eat with low fat content. However they have a much higher demand for essential fatty acids compared to normal persons, who need 12g per day only. Sportsmen with a high energy production need about 30g of essential fatty acids and this is quivalent to about 50g of a high quality vegetable oil like soy oil or germ oils.

The high demand for essential fatty acids is caused by the high fatty acid oxidation during physical activity. Fatty acids are not only a concentrated source of energy. The essential fatty acids are also the basic building material for all cell membranes and they are precursors for the synthesis of hormons in the body.

A basal supply of essential fatty acids is necessary for normal brain function too. Bodybuilders eating nearly no fat during their preparation for competition may develop an unnormal behaviour due to disfunction of the brain.

Therefore it is nonsense to produce protein drinks being free of fat and polyunsaturated fatty acids.

Addition of Medium Chanin Triglycerides (MCT's)

MCT's contain shorter fatty acids (8-10 carbon atoms) instead of the usual long chain fatty acid. MCT's occur naturally in cocos oil. The MCT's have some special properties making them very interesting for sports nutrition:

1. MCT's are easily digestable.
2. MCT's are metabolized to ketoderivatives which are an excellent source of energy for muscle cells.
3. MCT's in contrary to LCT do not reduce the utilisation of carbohydrates.
4. MCT's cannot be stored in adipose tissue.

Therefore MCTs are completely metabolized producing energy.

Minerals

The high content of milk protein guarantees a high supply of calcium and phosphate. The content of sodium should be low because the demand for sodium will be met by normal food and sports drinks. Potassium must be added as it's content in the protein and carbohydrates is very low. Potassium is very important for energy metabolism and glycogen storage as well as for growth of muscles.
Potassium should be added as potassium citrate. This compound is not only a source of potassium but also delivers alkaline metabolites. They serve for compensation of sulfuric acid which is formed from the sulfur containing amino acids in high value proteins.
The addition of magnesium is very sophisticated too: this mineral is very important for energy metabolism, muscle protein synthesis and as stress protector. Furtheron magnesium as carbonate or citrate expands the base capacity of the body and therfore supports cell protection against acidic metabolites as lactic acid for instance. Finally the relation between magnesium, potassium and calcium must be well balanced for a successful sports nutrition.

Trace elements

Protein drinks contain the trace elements mainly bound to the protein. Special selected caseinates are necessary to provide a good spectrum of trace elements.

Vitamins

Modern protein drinks should contain nearly all vitamins. One bottle should contain at least 50% of the recommended dietary allowance (RDA).
Furtheron in a protein drink for sportsmen vitamin B6 is of high importance: this vitamin is the key vitamin for amino acid transformation and thereby for protein synthesis.

Folic acid is a vitamin which is also important for sportsmen. But folic acid is absent in many multivitamin products and sports nutrition drinks.
The addition of vitamin a may be using the provitamine A, called beta-carotene (so called because it makes the orange colour of carrots).

Osmolarity

A sports drink should be nearly isotonic. This accelerates passing the stomach. Therefore an isotonic protein drink (up to 350 mosmol/l) supplies the protein bound amino acids faster to the body than hypertonic products.

The glass of the bottle

Good protein drinks contain some vitamins which are quite sensitive to light. Storage in a clear glass bottle causes rapid destruction of these sensitive vitamins. Therefore it is better to have glass bottles made of a special brown and light absorbing glass.

Protein drinks for power sportsmen

The most important time to provide protein is immediately after the training. Depending on intensity and time of training about 30 to 40g of protein are recommended. In case of a large muscle mass up to 50g of protein are needed.

Protein supply after a hard training has two reasons: First there is a substantial amino acid loss in the body after an exhaustive training. The pool of free amino acids in the body must be refilled as soon as possible to avoid the break- down of muscle protein and loss of muscle mass.
Furtheron more amino acids are needed for an enhanced protein syntheses as the wanted postive effect of a power training.
For professional power sportsmen a high supply of high quality protein all over the day helps to develop muscle mass and strength. However a maximum of 300g protein should not be exceeded.

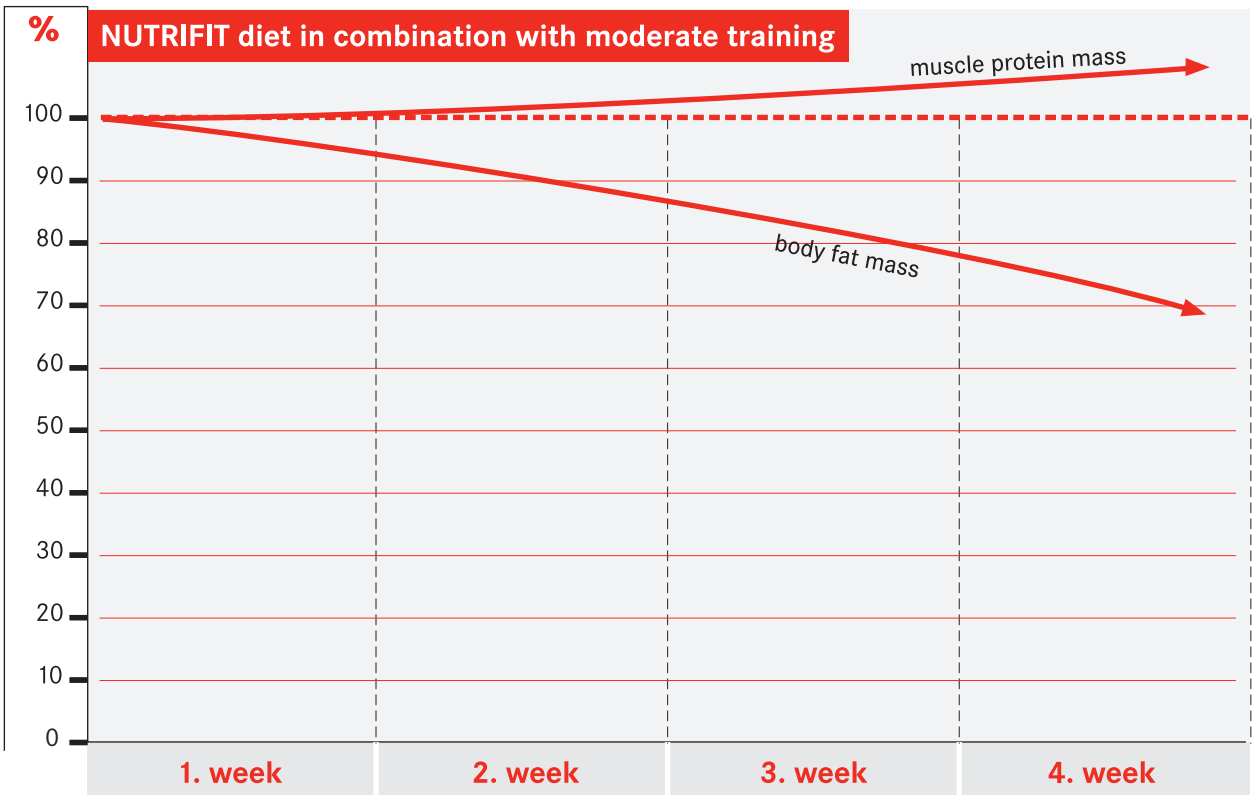
Protein drinks for endurance sportsmen

Endurance sportsmen have an elevated demand for protein too. They also loose amino acids during a long lasting training. That are for instance 40g of amino acid by one marathon run with moderate speed.
The deficit of amino acids must be compensated by easily digestable protein (or pure amino acids) to avoid the break-down of muscle protein. Thereby a protein drink shortens the time of regeneration and secures the positive effect of a well planned training.
For an endurance sportsmen one protein drink immediately after the training will be sufficient in most cases.

Protein drinks for expeditions and long journeys

A balanced diet with a high content of protein gives a good nutitional basis for expeditions. The protein supply acts against weight loss and muscle loss. Additionally the consumtion of a good and sterile nutrition product - the consumer is aquainted to - avoids troubles from strange food and thereby reduced capability.

For car drivers a protein-carbohydrate drink will help to maintain vigilance by stabilizing the glucose and amino acid concentrations in blood and brain.



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