

Casein and Whey: Milk Proteins That Could Make a Difference...

Casein and whey are by-products from the dairy industry and widely used in food manufacturing; to a large part in body building products. But which one is best used in supplement form? A combination of both, but at different times, may be the most effective way to support muscle build-up. "dietary-analyst.com" introduces the benefits and concerns surrounding milk proteins and its supplemental usage.

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Did you know?
that **casein and whey** are the main proteins found in milk?

Did you know?
that **casein and whey** are the most used proteins in bodybuilding supplements?

Why is Protein Important for You?

What is Protein?

Protein is part of the main macronutrients (e.g. carbohydrates and fat). Protein is a primary component of tissues, particularly muscle tissues. It supports your muscle development, improves performance, and helps with tissue repair.

Proteins are composed of smaller building blocks, called amino acids. Our body can use dietary amino acids (protein from foods) to convert them into needed body proteins. There are however eight amino acids that the body cannot make. These are called essential amino acids and need to be supplied through diet.

Protein is not only important for building up your muscles and it is not only important in times of increased exercise levels. The right amount and type of proteins are vital and an essential component of bones, cartilage, skin, hair, blood, hormones, antibodies and every single cell in our bodies.

Every body system, from immune system (for health defence and repair) to nervous system (co-ordination of movement) requires proteins to function effectively. Proteins are also the major building blocks for all body enzymes, catalysts for thousands of body processes, which also support repair and speed up recovery times in case of injury.

Protein Food Sources

Lean meats (e.g. beef, venison, chicken, turkey), fish, milk and dairy products (cheese, yoghurt), tofu, eggs, brown rice, sprouted seeds and pulses, nuts and seeds, beans (e.g. soy), lentils, whole grains, quinoa, amaranth, arthroches, spinach, beets, peas, broccoli, Brussels sprouts, avocado...

Quality vs. Quantity

Protein Bioavailability

Eggs (whole)	100	White Rice	56
Eggs (white)	88	Peanuts	55
Chicken/Turkey	79	Peas	55
Fish	70	Whole Wheat	49
Lean Beef	69	Soy Beans	47
Cow's Milk	60	Corn	36
Brown Rice	57	Dry Beans	34

Do you believe in the formula: "more workout + more protein = more muscle". This may be true in part, however, even though your body's protein needs may be higher when you increase your exercise levels, your body also requires the RIGHT proteins. The way our body can utilize amino acids of proteins is described as 'bioavailability'.

Eggs have the highest bioavailability (see table left). This means that when eating 20g worth of egg protein your body can use all the 20g of the protein. However, if you eat 20g worth of rice or bean protein, your body can only make use of 11.4g and 9.4g of protein respectively. Protein combining can increase total bioavailability. (E.g. if you eat rice and beans together, protein utilization can go up to 18.6g, increasing the biological value up to 93%.)



Why Milk Proteins?

Proteins from milk are highly bioavailable and relatively easy to extract. Milk proteins consist predominantly of caseins and whey. Casein and whey are by-products of the dairy industry. The UK market alone produces more than 13.5 billion litres of milk each year. In 2007, the dairy industry has become an £8 billion market. Casein and whey are widely used in infant formulas and dietary supplements like body building formulas.

What's Casein?

Casein is the major protein component of a e.g. cow's milk (about 80%). It is suspended in droplets on the surface of milk due to its poor soluble nature. Casein is coagulated (clumped together) by acids and enzymes (for example in the stomach) and is separated from milk by means of filtration.

Casein has wide applications in the manufacturing industries. It is used as binding ingredient and emulsifier in the food processing (e.g. non-dairy cheese substitutes, sweets, pasta, ice cream, food additives). Casein is also used in the chemical industry (e.g. for synthetic fibres, adhesive binders, glues, protective coatings and plastics).

Casein protein content in cheese (e.g. cottage cheeses) is 10 times higher than in milk, however, containing also higher concentrations of sodium and saturated fat.



Casein

○ Amino acid supply: Good (31%)
Casein is high in glucogenic amino acids (e.g. glutamine) and tyrosine to tryptophan ratio (5:1). Glucogenic amino acids can be used for energy production during exercise which may defer muscle breakdown. This muscle sparing effect is particularly useful during intense periods of training. Tyrosine may have energizing and anti-depressant effects. Tryptophan is known to have positive effects on mood due to its precursor activity, which facilitates relaxation and sleep, important for muscle recovery.

○ Absorption: Slow
Casein is less soluble due to its instant clotting action (forms a clump in the stomach after ingestion). This also slows down the absorption rate of other amino acids (e.g. from a meal or from whey). Casein's amino acid release lasts between 4 and 6 hrs.

○ Effect: Anti-Catabolic.
Casein's slow release action provides the body with a constant trickle (supply) of amino acids, which encourages a reduction in muscle breakdown and supports muscle recovery (e.g. at night when there is normally limited supply).

What's Whey

Did you know?
casein is better used before bedtime while whey before and after workout?

Whey represents about 20% of proteins found in milk. It is a by-product of the dairy industry (e.g. cheese manufacturing). Whey is the clear liquid (also called milk plasma) that is left over after milk has been curdled or strained. It is also formed on the surface of e.g. natural and cultured yoghurt.

Whey is also used in the food processing industries (e.g. cheese manufacturing (ricotta), and breads, commercial pastry, ice cream, biscuits, processed meats, desserts, animal feeds). Furthermore, whey consists of vitamins, minerals and is powdered from 75% lactose, which is a milk sugar beneficial to digestive health.



Whey

○ Amino acid supply: Very Good (58%)
Whey's bioavailability is 2.2 times higher than that of casein and contains similar levels of glutamine. It is also high in branched chain amino acids, which are amino acids that are metabolized in the muscles rather than in the liver. This is important for muscle synthesis e.g. before workout as well as after, encouraging faster recovery rates.

○ Absorption: Fast
Whey is fast release action with an absorption rate six times higher than that of casein, providing an instant supply of amino acids. Its properties provide fast amino acid release lasting between 20 and 40 minutes.

○ Effect: Anabolic
Whey's fast release action provides the body with an instant supply of amino acids, which encourages muscle build-up when needed (e.g. before or after a workout). It is therefore known to increase recovery rates, and helps improve athletic performance.

○ Plus: Lactose, Vitamins, Minerals
Whey also contains a high lactose content, supporting a healthy digestive system, while the remaining essential minerals and vitamins help support energy production.

