



Not all proteins are created equal.

Dairy protein is a high quality, complete protein.

By Aaron Fanning.



Introduction

As an essential component of the body, protein is built from a range of smaller molecules called amino acids. Our bodies need a range of amino acids, called indispensable or essential amino acids, to provide the substrate for growth, development in children, helping sports performance and recovery, as well as maintaining our muscles mass as we age. These essential amino acids can only be supplied through protein in our diet.

Dietary proteins can be separated into two categories of proteins based on their ability to provide these amino acids. Complete proteins are high quality proteins which provide all of the essential amino acids at the levels required by the body. Complete proteins include dairy proteins and common dairy ingredients such as milk protein concentrate, casein and whey protein. Incomplete proteins include maize, wheat, rice protein, gelatin and collagen which do not contain sufficient levels of the essential amino acids required by the body.

MEASURING PROTEIN QUALITY

There are many methods to measure the ability of a dietary protein to meet our daily requirements for amino acids. The most recent recommendation is the Digestible Indispensable Amino Acid Score (DIAAS) (FAO, 2013). This replaces the older Protein Digestibility Corrected Amino Acid Score (PDCAAS) method (WHO/FAO, 1991) which was known to have a number of methodological issues (Schaafsma, 2005; Schaafsma, 2012) i.e. overestimating the quality of poor quality, while preventing the expression of the true value of high quality proteins within the diet.

	DIAAS
MPC	1.18
WPI	1.09
WPC	0.973
SPI B	0.906
SPI A	0.898
PPC	0.822
Cooked peas	0.579
Cooked kidney beans	0.588
Cooked rice	0.595
Cooked rolled oats	0.542
Wheat bran	0.411
Roasted peanuts	0.434
RPC	0.371
Corn-based breakfast cereal	0.012

Table 1. The DIAAS values for a range of dairy and non-dairy protein sources (Rutherford et al, 2015)

DIAAS significantly improves the assessment of a protein's quality and continues to support dairy as the highest quality protein (Wolfe, 2015). This method provides an accurate understanding of how a protein supplies the basal amino acids to the diet and allows us to understand the ability of a protein to provide amino acids to support physiological change, such as protein to support muscle maintenance.

Muscle is essential for everyday physical activity and helps maintain our health throughout different life stages (Deer and Volpi, 2015). While muscle makes up 30-40% of bodyweight in a healthy young person (Janssen et al, 2000), muscle mass declines by as much as 27% from middle age onwards (Li & Heber, 2012). Dietary protein helps to maintain muscle mass by stimulating muscle protein synthesis (MPS) – it promotes new muscle development – and this process is stimulated by the amino acids like leucine, especially in combination with exercise.

The DIAAS method (Rutherford et al, 2015) indicates that a high quality protein like whey protein isolate, well known for its ability to stimulate MPS, provides almost twice the available leucine compared to soy protein isolate, for every gram of protein consumed. This partially describes why the consumption of whey protein stimulates MPS to a greater extent than soy protein in young (Tang et al, 2009) and older (Yang et al, 2012) adults. Making it apparent that protein quality plays a role in determining exercise linked muscle gains (Phillips, 2016).

SCIENCE INDICATES THAT DAIRY PROTEIN IS RAPIDLY DIGESTED AND STIMULATES LEAN MUSCLE GROWTH TO A GREATER EXTENT THAN ANY OTHER PROTEIN SOURCE

Another impact of dairy protein on MPS is the difference in the speed of digestion. Protein digestion is a complex process that begins in the stomach where complex proteins are broken down into smaller products known as peptides. These are released from the stomach into the small intestine where final digestion and absorption take place. The amino acids are then available for the body to use.

Casein is called a slow protein because, when consumed, it forms a curd in the stomach, which slows its release into the small intestine, causing the amino acids to appear in the blood over a long time frame. In comparison, whey protein is released from the stomach to the small intestine without forming a curd. It is quickly broken down into its component amino acids and quickly available for use by the body. Soy protein appears to result in an intermediate speed of digestion (Tang et al, 2009). The reason for whey's superiority for MPS stimulation over casein is believed to be due to the combination of the high levels of available essential amino acids and the unique digestion (Devries & Phillips, 2015).

Conclusion

A diet rich in dairy protein, in combination with a resistance training programme, optimises lean muscle gain and provides body composition benefits. Protein grows lean muscles.

In summary, dairy protein is a high quality complete protein available in varying formats that provide high levels of all the essential amino acids. These amino acids are available to the body, and can be delivered quickly to help support muscle mass, whether you are interested in improving performance from exercise, or helping to maintain muscle in your older age.





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