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The functions of essential amino acids

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Protein plays a role in building and maintaining body tissues, such as muscle and bone.[1] Proteins are made of smaller building blocks called amino acids, which can be classified into essential and non-essential amino acids.

There are **2** types of **amino acids**

The liver **can** produce **11** non-essential amino acids if dietary intake is insufficient

The body **cannot** produce the **9** essential amino acids (EAAs) and they need to be obtained from dietary sources. The 9 EAAs and their functions[2]:

Histidine

Necessary to produce histamine for immune response and sleep-wake cycles. Critical for maintaining myelin sheath, a protective barrier surrounding nerve cells.

Isoleucine

Involved in healing/repair of muscle tissue. Important for immune function, hemoglobin production and energy regulation.

Leucine

Important for protein synthesis and muscle repair. Helps regulate blood sugar levels, stimulates wound healing and produces growth hormones.

Lysine

Involved in protein synthesis, hormone and enzyme poduction and absorption of calcium. Important for energy production, immune function and production of collagen and elastin.

Methionine

Important role in metabolism and detoxification. Necessary for tissue growth and absorption of zinc and selenium.

Phenylalanine

Precursor for neurotransmitters tyrosine, dopamine, epi-nephrine and norepinephrine. Integral role in structure and function of proteins and enzymes and production of other amino acids.

Threonine

Major part of collagen and elastin, which are important components of skin and connective tissue. Plays a role in fat metabolism and immune function.

Tryptophan

Maintain nitrogen balance, precursor to serotonin, a neurotransmitter that regulates appetite, sleep and mood.

Valine

Helps stimulate muscle growth and regeneration and involved in energy production.

Foods that are rich in all **9** EAAs include milk, yoghurt, cheese, meats, poultry, fish and eggs.[3]

Milk is considered a source of **high quality protein** as evidenced by its **high digestibility factor** and the surplus of **EAA** as compared to the reference **EAA pattern**.[4,5]

Dietary protein must be **accessible** for **digestive enzymes** in the **gastrointestinal tract.** This might sound obvious but in fact it is not. Industrial food processing, product composition, cooking, plant cell walls, interaction with reducing sugars, and enzyme inhibitors–especially in plant based foods–all affect digestibility and therefore lower availability of EAAs. **Thus, protein quality is not only determined by the levels of EAAs but also by their digestibility.**[4,5]

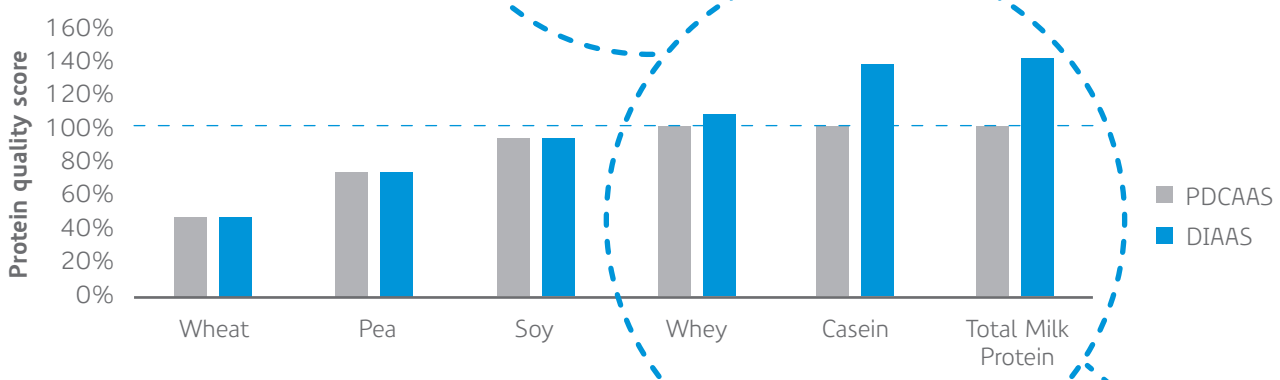
Currently, the Protein Digestibility Corrected Amino Acid Score (PDCAAS) is used to **measure protein quality.**

However, the Food and Agriculture Organization (FAO) recommends the use of the **newer Digestible Indispensable Amino Acid Score** (DIAAS). This score takes into account the correction for digestibility differences between proteins through knowledge of the digestibility of each individual EAA and not on the digestibility of the entire protein.[4,5]

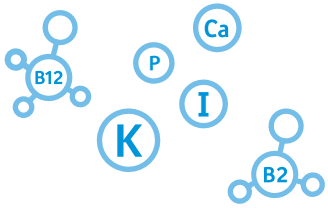
According to both methods, **milk protein scores well above**

100%[5-10]

High protein quality[5-10]



Milk contains more than just **high quality proteins**. It is also a natural source of calcium, phosphorus, potassium and the vitamins B2 and B12.[11,12]



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