



**marstall**<sup>®</sup>  
Premium horse feed

## **marstall feeding knowledge**

### **Why do horses need amino acids?**

*In almost every discussion about muscle building, the term "amino acids" pops up. With good reason: amino acids are components of a feed ration that make a big difference! We inform you about the types of amino acids that are of particular importance to horses, the effect they may have on the horse's muscles and the aspects you should pay particular attention to when feeding the animal.*

### **What do amino acids do?**

Amino acids are the building blocks of proteins. They are extremely important for the horse's organism — not only for muscle building, but for many other processes, too. They are, for instance, relevant for hoof and hair growth, for the connective tissue and the bones, for chemical messengers in the brain and in the nervous system, for cell formation in the entire body and for the production of milk and sperm. The bottom line is that amino acids are extremely important for all cellular processes in the horse's body. They are the "building blocks of life".

## **How do horses utilize proteins?**

Proteins consist of long chains of amino acids. Amino acids can only be absorbed by the horse when the proteins are completely digested, i.e. when the amino acids are no longer connected with each other, but form single units. Furthermore, horses are solely dependent on the types of amino acids that can be absorbed in the small intestine. That means that they can only utilize proteins that haven't been broken down or restructured before they reach the small intestine. All the others remain unused, move on into the large intestine and need to be metabolized there, putting a strain on liver and kidney.

For example, horses are able to digest 20 to 74 percent of the amino acids contained in hay. The substantial variation is to be put down to the difference caused by the fact whether the hay was cut early or late. When cut late, the stems are already lignified and the proteins, which consist of amino acids, are firmly bound to the cell walls. This means that the proteins can only partially be broken down into individual amino acids in the small intestine and are therefore only partially available to the horse. The type of hay horses are fed with is usually a late first cut with a high crude fibre content and rather low amounts of fructan and sugar. Therefore, it is important to ensure that every feed ration contains an adequate amount of easily digestible proteins or amino acids.

## **What are essential amino acids?**

There are many different kinds of amino acids, depending on the source there are 20 or 21 types. Horses are able to produce a large number of amino acids themselves, e.g. from carbohydrates. There are some, however, that they need to take up through their food. The essential amino acids are: lysine, methionine, tryptophan, leucine, isoleucine, threonine, valine, histidine and phenylalanine.

## **Absorption in the small intestine**

In order to cover their requirements, horses need to take up the essential amino acids in sufficient quantities directly from their fodder and absorb them in the small intestine. Even though some of the essential amino acids are produced in the colon area by the horse's gut bacteria, the horse's body cannot absorb them in a sufficient way from the large intestine. Which is to say that the positive effect on the organism is lost when absorption takes place from the large intestine.

## **Lysine is important for cell division**

There are three amino acids horses cannot produce themselves: lysine, methionine and threonine. These must be supplied through the fodder. In addition, these amino acids are first limiting: If one of them is not available in a sufficient quantity, neither of the three can be metabolized (Liebig's law of the minimum). Studies show that diet-related deficiencies exist especially with regard to lysine, methionine and threonine. For foals, lysine the first limiting amino acid, followed by methionine and cysteine — one more reason to place special importance on a sufficient amount of high-quality proteins when feeding foals.

- Lysine is especially important for breeding horses. It is responsible for cell division and growth and therefore equally important for the development of young horses and for nursing mares.
- Methionine has an antioxidative effect. It contributes to the formation of many substances, for instance to the formation of creatine, which is important for the hoof horn.
- Threonine contributes to the formation of enzymes and hormones. It is also needed for the formation of antibodies.

## **Non-genetically modified Soy**

Horses' requirements of essential amino acids can either be covered by administering natural straight feeding stuffs like brewer's yeast, linseed, alfalfa and soy or by providing them with pure amino acids. marstall offers essential amino acids in both forms. Many people associate soy with genetically modified food. At marstall, the situation is different: marstall's two manufacturing works in Germany are members of the "Verband Lebensmittel ohne Gentechnik e.V." (VLOG), an organisation that advocates the production of foodstuffs without genetic engineering. The production at marstall's follows the organisation's standards and the products are VLOG-certified.

## **Pure amino acids arrive where they are needed**

The alternative to administering natural products is feeding pure amino acids. Pure amino acids have the great advantage of being 100 percent absorbable and utilizable for the horse. When feeding pure amino acids, the owner of the horse knows for sure that the essential amino acids required by the horse are absorbed in the small intestine. Pure amino acids can be found, for instance, in the following marstall products: Amino-Muskel PLUS, Amino-Sport Muesli, Condición, Western Struktur-Müsli, and the products of the breeding line.

**By the way:** Did you know that marstall has been a pioneer in the field of amino acids for years? We are conscious of the important role high-quality proteins and readily available amino acids play for horses and apply this knowledge in our product formulations. In 2015, we even received the Equitana Innovation Award for our marstall Amino-Sport Muesli.



Further reading:  
„Pferdefütterung“, Helmut Meyer, Manfred Coenen, Enke Verlag  
„Fohlengesundheit durch richtige Fütterung“, Franziska Vogl, Dirk Winter, Birgit Jostes, Hochschule  
für Wirtschaft und Umwelt Nürtingen-Geislingen  
<https://weiterbildung-pferd.de/2017/07/17/fohlengesundheit-durch-richtige-fuetterung/>  
Nutrient Requirements of Horses, National Research Council of the National Academies, 2007  
Empfehlungen zur Energie- und Nährstoffversorgung von Pferden, GfE, 2014