

## HEALTHY HOOVES NEED GOOD NUTRITION



No hoof, no horse! Horse people understand perfectly well this old adage! But what are a horse's real nutritional needs for healthy feet, and when should adding a hoof supplement be considered?

A horse's foot is quite a complex system, with internal and external structures working in unison. The foot supports the horse's weight, while enabling the animal to be mobile; its strength and integrity begin at the cellular level thanks to the proper synthesis and organization of various nutrients.

Let's take a look at the hoof and the tissues that compose it. The hoof forms a capsule around the foot. Its structure is quite hard and strong, while remaining flexible and is therefore able to change shape under the horse's weight, while withstanding the various impacts to which it is subjected. The dermis, the part that attaches the hoof to the third phalanx (coffin bone), consists mainly of collagen, a tissue whose role is to fill, support and protect. The dermis needs to be flexible to allow the hoof and bone of the foot to move in every direction under the effect of the horse's weight. The dermis consists of nerves that control the blood flow and of numerous blood vessels that nourish the foot.

The catch phrase for healthy hooves is nutritional balance. It is important to ensure that the horse's daily diet is providing it with sufficient nutrients to prevent occurrence of the various foot-related ailments. The nutrients needed for the development and maintenance of strong healthy hooves are succinctly described here.

### AMINO ACIDS AND ENERGY

- The amino acids that form the various proteins are mostly used to synthesize collagen. More specifically, certain sulfured amino acids, such as methionine, allow the synthesis of intracellular substances that help "cement" the cells together and also allow the synthesis of structural proteins such as keratin. Keratin is particularly important, since it is the main protein of the tissue forming the wall of the hoof. Also, the fact that the amino acid methionine contains sulfur is beneficial, as sulfur is responsible for the bonds that provide stiffness and resilience to the hooves.
- A methionine deficiency, in addition to affecting the integrity of the hoof, can interfere with growth and lead to poor stress tolerance as well as skin problems.
- Like protein, energy is also an essential element, since, without energy, no metabolic functions are possible. In fact, apart from water, of course, energy and protein are the main so-called "limiting" nutrients, because, if they are not provided to the horse in sufficient quantities, the quality of the hoof will be deficient no matter how many vitamins and minerals the animal receives in its feed ration. The horse's primary sources of energy are fiber (hay, pasture, soy hulls, beet pulp), starch (grains) and fat (plant source).

## MINERALS

- One mineral that is especially involved in the development and maintenance of the hoof is zinc. Zinc plays a role in the health and integrity of hooves by promoting the division and protection of the cells of the dermis and the synthesis of the proteins. A clinical study has in fact shown that the quality of the hoof is directly related to its zinc content. Furthermore, zinc stimulates the synthesis of collagen present in significant quantity in the dermis.
- Other minerals that are of specific account in regard to the quality of the hoof are copper, manganese and selenium. Their action is especially beneficial to hoof health because of their antioxidant properties which protect the cell membrane. Also, copper, in addition to contributing to the formation of collagen and elastin (blood vessel membrane), contributes to the formation of disulfide bonds in the keratin which improves hoof quality.
- Clearly, if there is not a sufficient quantity of these minerals in the ration or, if their interactions are not balanced, hoof problems may arise down the road. These mineral deficiencies can also affect the horse's coat, lead to joint disorders and impair wound healing.

## VITAMINS

- The topic of hooves cannot be addressed without talking about biotin. Clinical studies have shown the beneficial effects of biotin in the restructuring of the hoof horn, more specifically the hoof wall. Used over a long period of time, it contributes to repairing horn deficiencies. Served alone, biotin has shown to be somewhat effective but, served together with methionine, the results are even more conclusive. Having said this, since biotin is difficult for the horse to absorb, it is important that the horse consume enough to obtain the desired effect.
- Other vitamins also contribute to maintaining hoof quality, notably vitamin E, a powerful antioxidant which, like selenium, manganese and copper, protects the cell membrane. Vitamin C, involved in the production of collagen and the maintenance of the integrity of the blood vessels, and vitamin A, active in the maintenance of the integrity of the epithelial tissue, tissue formed of one or more layers of cells, are also essential to maintaining healthy hooves.
- For badly damaged hooves, adding a biotin, methionine and zinc-based curative supplement, such as Purina's BMZ, is necessary until the condition is resolved. Besides adding BMZ, it is important that the horse's current feed ration be analyzed to ensure that it is indeed meeting all of its nutritional requirements, especially with respect to vitamins and minerals; if the horse has serious hoof problems, it is unlikely that its nutritional needs are being met.
- A complete supplement such as Purina's Equilizer (for adults) or Optimal (for mares and foals) will need to be added to their daily diet. Do not hesitate to contact our Purina equine consultants. They will be pleased to work with you and your farrier to ensure optimal hoof health. Once the horse's daily ration is complete and balanced according to its needs, major health problems will be past history, provided, of course, that farrier care remains regular and constant and is done by professionals.

## KEY POINTS TO REMEMBER

- The antioxidant properties of selenium are important to the maintenance of the hoof's integrity; sufficient quantities of this mineral must therefore be served in the ration. However, be careful not to exceed the horse's specific requirements, since selenium is the first mineral to become toxic when overused. One of the symptoms of selenium toxicity is the appearance of cracks and desquamation in the hoof horn. The other main symptoms are lameness and loss of hair in the horse's tail and mane. The symptoms of selenium deficiency are muscle cramping, white muscle disease, poor stress tolerance, decreased immune function and sub-optimal performance. That being said, selenium deficiency occurs much more frequently in the horse than excess selenium.
- Biotin cannot be toxic to the horse since any excess will be eliminated in its urine. There is no need however to serve it to your horse if it is already receiving all the nutrients it needs in its ration in a supplement tailored to its requirements.
- Watch out for interactions between the various minerals. Supplementing with the minerals discussed in this article without taking into account their various interactions can do more harm than good. For instance, feeding too much zinc compared to copper will affect copper absorption and, conversely, too much copper in the ration in respect of the amount of zinc will reduce the absorption of the zinc. In both cases, reduced absorption can lead to serious deficiencies. When in doubt, don't hesitate to contact one of our specialized equine consultants.
- If the condition of a horse's hooves requires the addition of a curative supplement, recommend supplements like BMZ which, apart from biotin, contains methionine and zinc, the latter chelated to increase digestibility. Keep in mind however that, if a horse is receiving a complete and balanced daily ration tailored to its requirements, for example by using Equilizer or Optimal, a specific supplement for hooves is usually not necessary. The appropriate serving of Equilizer or Optimal will be determined by the horse's weight, level of daily exercise and the amount of complete feed it is receiving every day. Purina's equine nutrition consultant is certainly the best placed to make the appropriate nutritional recommendations.