Equine Nutrition

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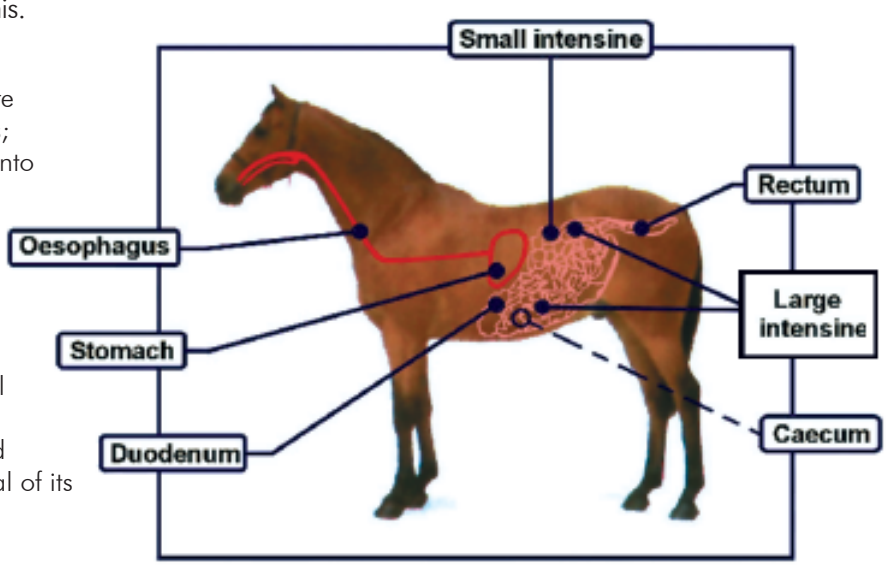
In this series of articles we want to keep you better informed of the nutrition of the (sports) horse. Nowadays, more and more is expected from horses. That means that horses receive better veterinary support, but 'nutritional' support often lags behind, however.
The use of a proper, adapted nutrition can prevent a lot of problems in the short but also in the long run and in this way the 'longevity' and the availability of your horses will increase. A correct nutrition will form the natural basis for top performances. With this series of articles we will try to make clear which things you have to take into account for a correct nutrition of your horses. In a first series we will disclose the DIGESTIVE SYSTEM of the horse so as to explain a number of practical things through this.

Digestion is a process in which food is being decomposed to its simplest form. Thus, proteins are broken down into amino acids; fats into fatty acids; grains into simple sugars (dextrose) and cellulose into volatile fatty acids.
In this way, the food can be absorbed in the blood stream and the body provided with vitamins, minerals, proteins, ... for growth and recuperation or they can be stored for future needs. The horse is originally an animal from the steppe that ate small quantities of grass. This is still visible in the digestive system: the small stomach (small quantities of fodder) and the well-developed large intestine (for digestion of cellulose) are typical of its digestive system.



THE MOUTH:
A first mechanic digestion and reduction of the food is effected in the mouth by the teeth. It is very important that this is done in peace and quiet and that all teeth are in good condition. For this reason, it is advisable to feed pellets with a broad diameter so as to oblige the horse to chew well.
During the chewing process, saliva is added to the food in order to facilitate the transport to the stomach. For a good saliva production, it is important that the horse drinks minimally 40 litres a day.

THE STOMACH;
The horse's stomach is relatively small (10-20 litres); this is the reason why the horse can only digest small meals in a adequate way. One has to take into account that the food is mixed with large amounts of saliva in the mouth and consequently the volume of the stomach will almost be twice as big. For an optimal stomach activity, it must not be filled more than two-thirds its volume.

In the stomach, it is mainly hydrochloric acid (HCl) and a number of enzymes (pepsin, lipase,...) that are responsible for the primary digestion of the proteins, fats and carbohydrates. The secretion of gastric juices starts already before the meal, under influence of external stimuli (such as noises in the food chamber,...). For this reason it is advisable to always feed the animals at the same time.
The content of a horse's stomach is less acidic than that of for instance a cow or a dog.

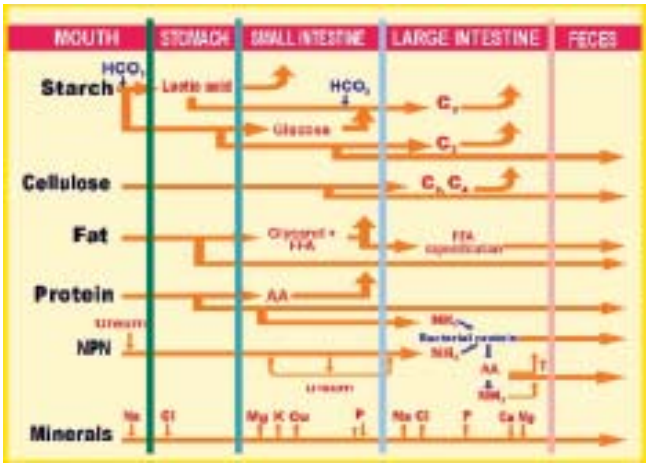
Recent research has shown that a great deal of sports horses (60% to 80%) have trouble with stomach ulcers. The most important cause of these ulcers is giving too little roughage and too big quantities of concentrate per feeding time. In this way, too many gastric juices are produced, affecting the gastric wall and thus cause stomach ulcers. Competition stress is another important factor.

THE SMALL INTESTINE:
Consists of 3 digestive systems;
1/ The pancreas breaks down the enzyme trypsine for further digestion of the proteins into Di peptides; lipase, for the further digestion of fats to fatty acids; pancreas amylase for the breaking down of starch into dextrine and bicarbonates for the creation of a less acid environment (behind the stomach, where the environment is rather acid)

2/ The gall is a secretion from the liver and consists mainly of gall salts that are necessary for the absorption of fatty acids and the fat soluable vitamins A,D,E,and K.

3/ The intestinal juice guarantees that a significant part of the food (proteins, fat, starch) is being absorbed in the small intestine and thus is released into the bloodstream. see figure

The part of the food that has not been absorbed (mainly cellulose and the excess of grains, proteins in the ration)



The liver;

Is a very vital organ of the horse. Horses have no gall bladder, and consequently the liver alone has to guarantee the production of gall salts for the digestion of fats.
The liver serves as a storage for vitamin A (up to 6 months of back up), energy (in the form of glycogen) and iron.

In addition to this, the liver intervenes in the digestion and storage of a large number of vitamins and minerals and in the elimination and detoxification of the rest products of the digestion. (For example: Ammonia from proteins, lactic acid from grains)
In this way, the liver of sports horses is often overburdened with the oversupply of certain nutrients (proteins, sugars, vitamins) and medicines.
Liver problems show very clearly in a blood test. There are clearly increased levels of indirect bilurbine, Y Gt, LDH 4 and LDH 5, ureum and a decrease in Albumins, ...etc.

THE LARGE INTESTINE;

With respect to volume, it is the most important organ of the digestive system and consists of 3 parts; the blind gut (cecum), the large intestine (colon) and the rectum.
A rich life of bacteria is present in the large intestine. Through these micro-organisms rough cellulose (from hay, straw, grass, concentrate,..) is broken down into volatile fatty acids that after release in the bloodstream are being used as energy. These micro- organisms are also responsible for the synthesis work; from residues from the protein digestion (nitrogenous fodder rests) they make microbial protein and for the rest they can also produce water soluable B-vitamins. This microbial protein, however, is only absorbed for a very small part. Therefore, it is important to feed horses easily digestible protein (that are absorbed in the small intestine). In a further series of articles on "horses' nutrition" we will elaborate on the various nutritive substances and nutrients that can be used.