

Pro Biotics

Equine Nutrition – Excerpts From What Was Published in Natural Horse Magazine 2002 "Why Probiotics and Digestive Enzymes are Important Feed Additives" by Jessica Lynn.

Thirty years ago a horse grazing in a typical pasture would have had the choice of approximately 30 or 40 different types of green plants, weeds, herbs and grasses, each bringing its own specific nutrients essential for a balanced diet. All of which contain natural sources of digestive enzymes and naturally occurring beneficial bacteria, minerals, vitamins and other micro-nutrients. Today, in that very same pasture, because of selective seeding, herbicide spraying, etc. the grazing is limited to sometimes as few as 4 varieties of "plants" or grasses, and not many with any significant nutritional value.

To me feeding horses just alfalfa would be like feeding yourself or your child only the same processed food day in and day out, like a "Happy Meal" (sorry MacDonald's), with no variety in nutrition or vitamins and minerals. In the case of alfalfa coming from the Imperial Valley area of California there is also the risk of significant mineral imbalances, with high concentrations of herbicides and pesticides which can adversely affect the horse's liver and immune system.

What I find is that many people then will spend even more money on over-processed "feedstuffs" which may contain wheat middlings, soybean meal, plant protein by-products, molasses and other cereal type ingredients that are typically mechanically heat processed, cooked, steamed, extruded, and cubed. All the processing coupled with extended storage often destroy essential enzymes and nutrients and they are just being given a "sugar sweetened puffed cereal" with in-organic vitamins and minerals added back that are not as readily bio-available to the horse, however, they are inexpensive for the manufacturer to use.

From all of this over-processing of concentrated feeds, depleted-nutrient deficient soils, and stress, some horses are also beginning to suffer from food enzyme deficiencies, which can by themselves lead to an array of non-specific symptoms related to this situation including non-specific laminitic and colic like symptoms. Insuling Resistance, Cushing's and EPSM. Your horse's body requires enzymes to process and deliver its food, it also needs good bacteria to break down and absorb the nutrition found in that same food to maintain health and well-ness, to stay sound and active.

The equine athlete, backyard horse or breeding stock all have certain nutritional requirements in order to support their health. All benefit from well balanced nutrition, including a variety of hays that are carefully grown, put up, stored then selected, a good concentrated feed ration or balanced nutritional program that would be suited to the age and work load of the horse, along with supplementation of a high potency microbial/probiotic/digestive enzyme product, like Pro-Zyme, should be added to their daily feed ration for maximum absorption and use of whatever their feed stuffs may be.

The most common sources of digestive disturbances in horses are caused by stress, some of which may be brought on by: sudden changes, unseasonable weather conditions, moving, competition, training, the psychological stress of travel & showing, worming, parasitic infestations, vaccines, viruses & antibiotics; breeding, mares in foal, foaling, and weaning both for mare and foal. Unfortunately, the micro flora/microbial balance in a horse can be upset much faster than it can be restored. The effect may not show up immediately, but a horse's beneficial intestinal bacteria can be

destroyed or depleted and the pH of this environment can be altered during these times.

Stress can also be created by alterations of weather, environment, feeds and water. Without the beneficial intestinal bacteria, food passes through the system, is not "fermented" in the way it was intended, food therefore remains undigested. This undigested food passing through the gastro-intestinal tract may then lead to situations such as colic or colic like symptoms, bloat, founder or increase the possibility of developing feed related allergic conditions.

All horses seem to benefit from mineral fortification which can be found in most concentrated type feed formulas. However, there is a difference in absorption and use in the type of minerals used which consumers need to cognizant of. *"Minerals are the requirement of all metabolic processes in the animal's body and the deficiency of some minerals can lead to poor performance. Minerals in feed supplements are available in both organic and inorganic forms. Inorganic forms of minerals consist of sulfates, oxides, and carbonates, these forms are less expensive and most commonly added; however, high concentrations of inorganic minerals can interact with other feed ingredients, thereby decreasing their bio-availability and bioactivity. Organic forms of minerals on the other hand are usually linked to an amino acid carrier where they are "escorted" across the stomach of the digestive tract with greater efficiency (Feedstuffs 1993).* Therefore, that also becomes an important consideration when researching products for your horses.

However, if your horse has any kind of metabolic health challenge, then labels must be read, and if a concentrated feed is 10% or less in NSC (carbs and sugar) then it should be safe to feed. Metabolically challenged horses need extra minerals and vitamins, and Uckele's in Michigan has several formulas just for that purpose.

Some people believe that if you feed probiotics/digestive enzymes all the time that the horse loses its ability to naturally produce their own. Researchers have not found this to be the case. However, what we have found is that the horse has been losing its own "natural" ability to produce all that it needs to properly digest and absorb the nutrients from its food, and/or its ability to recover what it needs because, let's face it, for the most part it is fed an "un-natural" diet of stored hays and over-processed feed stuff which has lost the naturally occurring enzymes the horse needs.

In some areas of the country horses are kept in barns in small stalls with no pasture available during winter months, some never get pasture because they are in "show barns", some are on the western show, reining, cutting, barrel racing or rodeo circuit. While other more fortunate horses may get a variety of grasses and hays they may be given monthly or daily wormers, and/or rounds of antibiotics, or are vaccinated regularly because of barn, boarding facility, or show requirements, all of which alter the horses ability to properly digest and absorb the nutrients from its food. While it may be true that you do not "need" to feed probiotics/digestive enzymes on a daily basis, it is advisable to feed them at least as a preventative measure as mentioned earlier in this article.

To fully understand the role of probiotics, as well as digestive enzymes in your horse's diet it is important to have a simple or even basic understanding of the equine digestive system: When a horse eats, his food begins an approximate 100-foot journey through the digestive tract. Food is ground by the teeth and its mouth releases enzymes, the food then mixes with digestive juices as it enters the stomach where millions of bacteria begin their work. As the food enters the stomach and small intestine a fermentation like process begins its journey. Although the stomach in a horse is relatively small compared to its size, it is one of the most important areas for initiating the breakdown of nutrients using digestive enzymes and stomach acids. Very little absorption takes place in the

stomach, with the major part of absorption occurring in the small intestines, with a lesser amount of nutrient absorption occurring in the cecum and large intestine.

The small intestine is the area where most soluble carbohydrates are absorbed along with minerals, fats and proteins. Insoluble carbohydrates that are not so easily digested, as well as any undigested soluble carbohydrates, are then passed in to the cecum, which is the "fermentative vat" and comes before the large intestine.

The purpose of the bacteria in the "fermentation vat" (cecum) is that a large array of microorganisms are needed to breakdown the remaining nutrients passed from the stomach and small intestine into a viable usable form. The action of these bacteria within the cecum allow the fibers to be broken down into volatile fatty acids that can then be absorbed and used as not only an energy source by the horse but to help it in meeting its daily vitamin requirements as well.

The specific breakdown which occurs during this microbial fermentation process are of the volatile fatty acids, carbon dioxide, microbial proteins, and digestive enzymes with some vitamins such as K and B-complex. The concept of microbial fermentation occurs to some extent in all animals that eat foods of plant origin, including horses and humans. Horses (as well as some humans) depend largely or in some cases entirely on fibrous plant materials (hays, plants, and vegetables) have to rely upon the large colon portion of the intestinal tract for the fermentation and microbial breakdown to occur.

The population of beneficial microorganisms, in the cecum, remains relatively stable under "normal" circumstances and conditions. As long as a horse is never stressed, never needs to be wormed, never has a change in feed, and never needs antibiotics, then the balance should remain un-altered and remain "stable". The reality is that our horses do have stressful event occur, do need antibiotics occasionally, do have feed changes with the seasons and with each load of hay we buy, and will need to be wormed from time to time.

There are three kinds of "bacteria": good, neutral and bad. The horse needs a balance of the "bad" bacteria to keep the "good" in check. As long as the balance of "good & bad" bacteria remains constant and the gastro-intestinal tract is stable, the horse remains healthy. When the balance is upset, the horse may eat, but may not be able to digest properly or assimilate the nutrients he needs from his food. When this occurs it may begin to show up as a dull coat, skin conditions, inability to maintain weight, slow foot growth or other medical conditions including diarrhea.

Digestive Enzymess

Enzymes are one of the most important factors for digestion and begin the digestive process, they are functional protein molecules that can catalyze and accelerate the rate of feed digestion. The function of the most common digestive enzymes include:

Alpha Amylase – Breaks down carbohydrates, including starch, into simple sugars.

Protease – Digests protein into peptides and amino acids.

Cellulase – Splits the ?eta 1,4 glucose linkage in cellulose (fiber) into available glucose.

Lipase – Digests fat into fatty acids and glycerides.

beta-Glucanase – Breaks down beta-Glucan – long chain carbohydrate (arabinose, xylose & ribose).

Phytase – Aids in utilization of normally indigestible organic phosphorus in phytates (phytic acid).

Microencapsulated Live Beneficial Bacteria

Beneficial bacteria (Probiotics) including *Lactobacillus acidophilus*, *Enterococcus faecium*, and *Bacillus subtilis* are beneficial microorganisms, which have been proven to replenish essential microflora and decrease the incidence of gastrointestinal disorders. Beneficial bacteria, especially *Lactobacillus* sp. can produce specific anti-microbial substances that have been observed to inhibit the growth of some pathogenic microorganisms including *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella* sp. These beneficial microorganisms are most effective to use during periods of disease or stress and following parasitic prevention programs or antibiotic treatment when no lactic acid bacteria are present.

Beneficial bacteria cause no tissue residual effect or possible microbial mutation. It is also important that the live beneficial bacteria be microencapsulated so that they may travel through the stomach acids intact so that they are released to do their job in the hindgut.

Probiotics also provide a way of limiting the number of harmful bacteria, parasitic infestations and pathogens in the digestive system, thereby also limiting their effects on the horses overall health and well-being. The equine athlete, backyard horse or breeding stock all have certain nutritional requirements in order to support their health. All benefit from a well-balanced probiotics/digestive enzyme added to their daily feed ration because they all share common "stress" factors that are known to cause digestive disturbances.

Research is also showing that horses in England may be able to escape "Grass Fever" if their owner's have them on a highly concentrated probiotic/digestive enzyme which seem to prevent them getting this horrible and 99% deadly disease.

There appears to be a small number of manufacturer's who are beginning to market a limited number of probiotics type formulas, because of customer inquiry and demand, however, they are not all the same. Many only include one or two items in their formula at unspecified and un-guaranteed microbial or beneficial bacterial counts/rates. It is interesting to note that most manufacturers do not guarantee the microbial populations, or the live and beneficial bacteria counts, or may only guarantee them on the date of manufacturer, which is one of the most important factors to consider before purchasing a product. Most do not use a balanced blend of digestive enzymes in their formulas, because that is either not in their field of expertise or the public is not yet aware of their benefits. Some products are made up of mostly inert "delivery systems" or "fillers", they do not contain live concentrated foods that are most beneficial to the horse and are very cost effective.

There is no exact or "right way" to feed probiotic/digestive enzyme formulas. They do not have to be fed daily, however, for the best results and for the good of the horse I do recommend feeding them on a "regular" if not daily basis. I personally mix the formula I use with my horses "goulosh" formula which you can find in the article titled "***Feeding Redommendations***". Pro-Zyme is the probiotic/digestive enzyme formula we manufacturer, it was designed by a Microbiologist/Zoologist and contains a specific concentrated blend of beneficial bacteria, yeast cultures, and digestive enzymes, with organic minerals and anti-oxidents, formulated to maximize intestinal flora and digestive efficiency. They are pleasant tasting specie specific powders (as we also manufacture them for dogs and cats as well as farm animals) with a guaranteed beneficial microbial count, designed to be used as a daily topping or dressing. Our products are meant to complement your animals feed ration, not replace it, to assist them in the absorption and utilization of what you already feed.

What we have found with our experience in having well over 3,000 horses on the products is that all horses seem to benefit from mineral fortification, including all 78 trace minerals, however, there is a

difference in absorption in the type of minerals used which consumers need to be cognizant of.

"Minerals are the requirement of all metabolic processes in the animal's body and the deficiency of some minerals can lead to poor performance. Minerals in feed supplements are available in both organic and inorganic forms. Inorganic forms of minerals consist of sulfates, oxides, and carbonates, these forms are less expensive and most commonly added; however, high concentrations of inorganic minerals can interact with other feed ingredients, thereby decreasing their bio-availability and bioactivity. Organic forms of minerals on the other hand are usually linked to an amino acid carrier where they are "escorted" across the stomach of the digestive tract with greater efficiency (Feedstuffs 1993)." Therefore, that also becomes an important consideration when researching products for your horses.

Twenty five years or so ago, no one ever heard of ring bone, or navicular, or half of the problems that today's horses seem to be having. What has changed? It is in my opinion that the way in which we are feeding our horses is contributing to the problems. It is the over processed feed stuffs, lack of minerals, enzymes, and the wrong kind of hay (straight alfalfa). They no longer have pastures and herbs to graze on and are becoming deficient in many nutrients, enzymes and lack the proper microbial's/probiotic's necessary to absorb what they do receive. This is not "science" this is all just common sense!

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