Why do horses eat dirt, wood, and other indigestible things?

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This article is about a few of the seemingly aberrant feeding behaviors one sees from time to time in domestic horses. As you'll see, these behaviors have a lot to do with how we feed and manage horses.

Why do horses eat dirt?

Dirt eating can be normal behavior in horses. In most cases it is probably a form of self-supplementation or self-medication. (Based on observation of wild animals, most biologists and naturalists agree that animals do appear to self-medicate at various times and in various ways. *Wild Health: lessons in natural health from the animal kingdom* is a wonderful book on this subject by biologist Cindy Engel, PhD, if you're interested in reading more.)

Horses may eat dirt for any one of several reasons:

- needing salt (specifically, the sodium in salt)
- needing other minerals
- needing beneficial micro-organisms from the soil to aid digestion
- needing the absorbent activity of clay to settle a digestive upset
- boredom, habit
- presence of a disease which alters mental function

Salt and mineral seeking behavior

Horses and other herbivores are meant to get the minerals they need for health, growth, and reproduction from their food—plant material. The more varied the selection of plant materials and grazing areas, the more able horses are to meet their needs. Sometimes, though, the available forage does not meet all of their mineral needs, so they must go in search of other sources of sodium and whatever other minerals they may be lacking at the time. This salt- or mineral-seeking behavior leads them to lick rocks, earth, and even each other. (Gross and long-standing dietary deficiencies in phosphorus or protein may even lead herbivores to chew on the carcasses of other animals.)

Offering the horse salt and feeding a well-formulated mineral supplement that is appropriate for the individual horse's needs should stop the dirt eating if this behavior is being driven by nutritional deficiency. My preference for feeding salt to horses is to offer it free-choice, as loose or block salt in a pan separate from the horse's food. Not a mineral block; just plain salt. It can be no-frills coarse rock salt or a white salt block, Redmond salt (a good-tasting natural-source salt whose impurities give it a pink tinge), or a fancy Celtic sea salt. It doesn't matter all that much, as long as the product is close to 100% salt (sodium chloride) and not a bunch of other minerals.

I prefer not to add salt to the horse's food or put a salt block in the bottom of the horse's feeder, unless I'm trying to increase the horse's sodium or water intake for a specific medical reason. The body regulates its sodium content very closely, as the sodium concentration in the blood

and other body fluids is one of the prime determinants of the body's total water content. An adequate but not excessive amount of water is essential for virtually every function in the body, so the body regulates its water content very closely. In addition to the mechanisms of thirst/drinking and urination for controlling its water content, the body has a specific and very refined appetite for sodium. This mechanism is so well regulated that I prefer to let the horse's body take in as little or as much salt as it needs at the time, rather than thinking I know better.

This regulatory mechanism (involving a specific appetite) seems to be far less refined with other minerals. That is one reason I don't like using mineral-salt blocks for horses. The horse has a specific appetite for salt, so if the horse goes in search of salt, then I'd rather she not inadvertently take in other minerals as well as salt when those extra minerals may not be needed at that time.

Other issues I have with mineral-salt blocks include the formulation (many are intended for both cattle and horses, and that doesn't work well for either species), the amounts of the various minerals supplied (the horse may get too much or too little of a particular mineral, as intake of the mineral block is primarily driven by salt appetite or the presence of a taste enhancer such as molasses), lack of specificity for the individual's needs, and the form of minerals used (typically they have very low bioavailability in horses).

For these reasons, I prefer to feed a well-formulated mineral supplement (selected for the individual horse's needs) and offer salt separately and free-choice. I love the idea of offering minerals to horses free-choice. After all, that is how wild herbivores supplement their mineral needs when their diets are deficient: they go looking for other sources of minerals and consume that source until they've met their body's needs. However, I think this concept is very difficult to execute well when it comes to supplementing our well-fed domestic horses.

There is at least one equine feed supplement company which advocates feeding minerals free choice. A variety of different mineral supplements are offered, each designed to meet a primary deficiency a horse may have. My main problem with this approach, though, is that most of these products contain fillers or carriers which double as taste enhancers, such as wheat middlings, alfalfa, and even salt or a sweetener. It is an erroneous conclusion to say that a horse was lacking in a particular group of minerals because he licked the bowl clean of a particular supplement, when what he most likely was after is the wheat or alfalfa. In my experience with these products, it is common for horses, especially the overweight carb junkies, to practically inhale some of these tastier offerings and completely ignore the less palatable ones.

I keep hoping to find a really good natural-source, free-choice mineral supplement for horses that is based on how wild herbivores normally meet their mineral needs when their forage diets are lacking. Until I find a product I'm really satisfied with, I'll continue to recommend supplements that have been thoughtfully formulated by well-trained and credentialed equine nutritionists and that are backed by good clinical research and practical use in many different situations. There are several such products available that meet these criteria. My favorite so far is Platinum Performance Equine (www.platinumperformance.com).

Beneficial soil microbes

The third possibility on the list is that the dirt-eating horse is in need of beneficial micro-organisms from the soil to aid digestion. Healthy digestion in horses relies on a healthy population of bacteria, protozoa, fungi, and other micro-organisms in the digestive tract, particularly the large intestine (cecum and large colon). These organisms aid in digestion, particularly the breakdown of dietary fiber, and they serve as an effective defense against potentially harmful (i.e. pathogenic) bacteria such as *E. coli* and *Salmonella.*

These beneficial organisms are primarily derived from plant material and the soil in which it grows. (In young foals, the feces of older horses provide many of these microbes.) Horses on highly processed diets and who get very little pasture turnout time can be deficient in these essential microbes. My preference for resolving this problem is to provide more pasture turnout time and a more natural diet. Supplementing intestinal organisms in the form of a probiobic product is a poor second to allowing the horse to live closer to the earth.

Probiotics definitely have their place in equine medicine. However, we're still a long way from really understanding that place and having a good grip on effective probiotic use in horses. In my experience, probiotics too often are overused, inappropriately used, and even inappropriately formulated for horses. We still know too little about the veritable universe of micro-organisms which normally inhabit the healthy horse's digestive tract to know what, if any, microbes we should be adding, and in what quantity and for how long. Only a handful of studies on probiotics have been conducted in horses so far, and in some of those studies specific micro-organisms thought to be beneficial as probiotics actually caused diarrhea and other digestive upsets.

There are other issues with probiotic products, not the least of which are quality control (whether what is listed on the label is actually in the product, the viability of the organisms, etc.) and dosage (how many organisms are needed, and for how long). But that's a topic for another time.

The most intriguing probiotic product I've come across so far is Primal Defense by Garden of Life. It's a human product formulated to supply the types of micro-organisms we'd naturally get from the soil via our food if we lived a more natural lifestyle and ate a more natural diet. I love this product for dogs and cats (and humans), but for horses I recommend it only for chronic, unresponsive digestive disturbances or following intensive antibiotic therapy. Provided the horse gets to graze for at least a few hours per day, he should be getting a good quantity of these beneficial soil organisms directly from nature, so probiotic supplements should not be needed unless there is a long-standing disruption in the normal intestinal flora.

Absorbent properties of clay

Microbes aside, some horses appear to eat dirt primarily for its absorbent properties. Clays, in particular, contain very absorbent particles which can bind up bacterial toxins, organic acids, certain viruses, and other potentially harmful substances in the gut. The bound toxins are then harmlessly removed from the body in the manure.

I have known seriously ill horses with disordered digestive tracts to selectively eat the clods of dirt that cling to the roots of a clump of grass rather than eating the grass itself. That's not to say

that if a horse is eating dirt then she may be seriously ill. However, it is worth considering that she may have a digestive upset of some sort. For example, there may be too much starch or sugar in the diet (whether from grain or lush grass) which has disordered the normal microbial population of the digestive tract. In addition to restoring the microbial population in the bowel, eating dirt may be helping simply by virtue of its absorbent properties.

There are several different clays that have been refined for use as medications or as feed additives for the prevention of digestive problems in feedlot cattle on high-grain diets. They include kaolin, bentonite, montmorillonite, and smectite. I used to use bentonite as a feed additive in uptight horses on high-grain diets. It worked very well to calm the horse and normalize the manure, which otherwise was loose and smelly. These days I much prefer to decrease the amount grain in the diet and use fat instead to meet the horse's caloric needs.

For horses with digestive problems, and for those who continue to eat dirt despite salt and mineral supplementation and plenty of pasture turnout, it may be worth reviewing the diet and, if dietary changes don't do the trick, adding BioSponge (www.platinumperformance.com) to the diet for awhile. BioSponge, as the name suggests, is a dietary aid that contains one of the super-absorbent clays. It has been tested in horses, in an independent study at the University of California-Davis, and found to effectively absorb bacterial toxins in the horse's bowel. While the horse may get what she needs by eating dirt, I'd prefer to use a refined clay rather than dirt, with all its impurities and who-knows-what-else.

Other reasons

For horses who eat dirt out of boredom or habit, providing more grazing time (or more simulated grazing time in the form of hay), more company, and more daily activity which is physically and mentally stimulating should help. If the horse is eating dirt because of a disease which is affecting mental function, then there will likely be other behavioral or physical indicators of illness. These horses require veterinary attention.

Why do horses chew wood and debark trees?

Wood eating can be normal behavior in horses, or it can indicate a problem, such as illness, inadequate dietary fiber, or boredom. Bark, branches, roots, and other seemingly inedible plant parts form a small but important component of the horse's natural diet. These plant parts provide extra fiber and a diversity of nutrients. Bark, twig, and root eating may also be a form of self medication in some instances, as these plant parts often contain substances with medicinal properties (e.g. anti-inflammatory salicylates in white willow bark). But that's a topic for another time.

As they rely on it for digestive health and energy production, horses have an absolute need for dietary fiber ("roughage"). The rock-bottom *minimum* amount of roughage needed per day is 1% of the horse's body weight, calculated on a dry matter basis (i.e. taking into account the water content of the food). Well-made and properly stored hay is less than 10% water, so to keep the mathematics simple, let's say it is close enough to 100% dry matter. That means the daily *minimum* fiber requirement, if the horse consumes little or no pasture, is 10 lbs of hay per day for a 1000-lb horse (1% of 1000 is 10). That's just to meet the horse's minimum fiber requirements; calories, protein, vitamins, and minerals will very likely be lacking at this level. Most horses are

much healthier and happier when fed good quality roughage at a rate of 1.5% to 3% of body weight per day (15–30 lbs of hay, if pasture is limited).

Depending on the time of year, the water content of pasture grasses can be over 70% (i.e. less than 30% dry matter, including dietary fiber). In the spring and sometimes in the autumn, when the grass is lush and rapidly growing, a horse on full pasture turnout may not be able to meet his minimum daily requirement for dietary fiber from pasture alone, even when there is plenty of grass. At these times, horses on pasture often benefit from supplemental hay to meet their daily fiber needs.

If the horse is not getting his fiber requirements from his diet, then he will go in search of it. That's when horses begin chewing fence posts, boards, wood stall doors or partitions, trees, etc. Bored horses also have a tendency to chew these objects. So, in addition to providing more variety in the diet and more pasture turnout (and/or hay), also provide more physical, mental, and social stimulation for the horse.

Why do horses eat manure?

Manure eating (coprophagia) can be normal behavior in horses. In young foals, eating the mother's manure is a normal developmental stage. Through this behavior the foal learns to explore his environment and use his senses to make choices about what is palatable and what is not. He is also getting some dietary fiber and the beneficial intestinal microbes needed to support his own digestive processes once he begins eating solid food. In addition, the healthy intestinal microbes are an effective barrier to pathogenic bacteria which could adversely affect the foal's health.

In older foals and adult horses, manure eating may be a way of supplementing intestinal microbes, dietary fiber, and perhaps other nutrients that are lacking in the horse's own diet. Coprophagia is normal and nutritionally necessary behavior in rabbits, a species whose intestinal tract is very similar to that of the horse. Many nutrients released or produced by microbial breakdown of dietary fiber, as well as the microbes themselves (which are a rich source of proteins, lipids, vitamins, and numerous co-factors), are lost in the manure. Rabbits make effective use of these valuable nutrients by ingesting manure for a second pass. Perhaps some horses who eat manure are doing a similar thing, particularly if they are on a very restricted diet (e.g. dry lotted with just poor quality grass hay because they need to lose weight).

Manure eating in horses can also be caused by boredom or social disorder (e.g. isolation, incompatible company, frequent changes in the horse's turnout routine or companions). As with dirt and wood eating, taking a closer look at the horse's diet and management should identify where improvements may be needed.

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