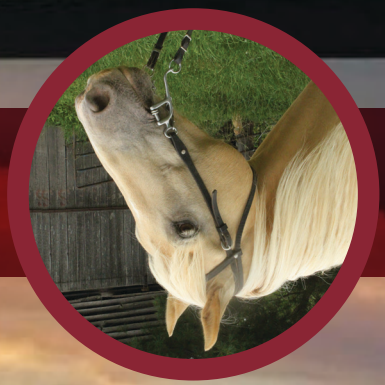
SINCE 1929

Augusta Cooperative FARM BUREAU, INC.

PRST STD
U.S. Postage
PAID
Permit No. 80
Staunton, VA

AUGUSTA COOPERATIVE FARM BUREAU, INC.
1205B RICHMOND RD.
STAUNTON, VA 24401

AUGUSTACOOP.COM
/ AUGUSTACOOPERATIVEFARMBUREAU
/ AUGUSTACOOPFB



AGRONOMY & EQUINE EDITOR

November 2023

SINCE 1929

Augusta Cooperative FARM BUREAU, INC.

ORGANIC VS. INORGANIC TRACE MINERALS IN YOUR HORSE'S DIET – A SCIENTIFIC COMPARISON

Trace minerals are a small component of your horse's overall dietary intake, but they play essential roles in equine well-being and health.

These minerals can be provided in your horse's diet in either an organic or inorganic form. Not to be confused with organically-grown foods, organic minerals are bonded to organic compounds in their molecular structure.

This structural difference impacts mineral absorption in the gastrointestinal tract: organic minerals are easier to absorb for your horse's body than inorganic minerals.

In this article, we will discuss the difference between organic and inorganic minerals, the benefits of feeding organic minerals, and how to tell which forms of minerals are used in horse feeds and supplements.

Organic vs. Inorganic Trace Minerals

What are organic trace minerals?

Organic compounds are substances, "relating to, or derived from, living matter."

All living matter contains the element carbon in its molecular structure. Organic minerals must have a carbon-containing molecule in their molecular structure.

What are inorganic trace minerals?

Inorganic minerals are bound to compounds that do not contain carbon, such as sulphates or oxides. They have been traditionally used in feeds since inorganic minerals are cheaper and easier to produce.

Are Organic Minerals Better than Inorganic Minerals?

Organic trace minerals are considered superior to inorganic minerals because of improved outcomes seen in feeding trials.

When animals are fed organic trace minerals, researchers observe improved mineral absorption and increased production responses.

These improvements are attributed to a higher bioavailability of organic minerals. Bioavailability reflects how easily the mineral is absorbed and utilized in the body. Improved absorption of organic minerals is shown by increased mineral levels in tissues and decreased fecal excretion.

These research studies are mostly performed on agricultural animal species. However, recent research on horses also shows several benefits of feeding organic trace minerals.

Top 3 Benefits of Organic Minerals

1) Improved Mineral Absorption

Inorganic minerals can interfere with the absorption of other minerals or compounds in the digestive tract. For example, equine diets that are high in iron can inhibit the absorption of copper and zinc because these substances compete for the same transporters in the small intestine.

However, organic amino acid complexes of zinc and copper do not face the same problem. These mineral complexes are taken up via amino acid transporters in the gut and so their absorption is not blocked by high iron levels.

Inorganic minerals may also bind to other compounds, making them less available for the animal to absorb. Organic minerals are less likely to bind with other nutrients, and are more readily absorbed.

Research in horses shows that feeding organic selenium yeast results in higher bioavailability compared to inorganic selenium. This is shown by decreased excretion and higher blood selenium levels.

Improved absorption with organic minerals has been demonstrated in multiple species, although there is some contradicting data in horses.

In one study, yearlings supplemented with organic copper and zinc had significantly higher copper digestibility and daily zinc balance compared to yearlings fed inorganic minerals.

Another study found that feeding organic copper and cobalt resulted in improved mineral digestibility.

However, some studies have found no difference between copper, manganese and zinc absorption with mature geldings fed organic or inorganic minerals.

The contradictory studies on organic minerals in horses make it clear that more research is needed to understand potential differences between different forms of organic trace minerals.

However, research on other species and positive preliminary data in horses suggests that organic minerals may be more absorbable for your horse.

2) Joint Health Benefits

The trace minerals copper, zinc, and manganese are particularly important for supporting soft tissues in joints. Providing these minerals in a bio-available form may increase their uptake or utilization in soft tissue.

continued on page 2

Researchers found increased cartilage synthesis and decreased cartilage degradation in horses fed a joint health product containing organic trace minerals. The researchers partially credited the changes in cartilage turnover to the improved bioavailability of organic trace minerals.

Another experiment found that yearlings fed a diet with organic trace minerals had an improved rate of cartilage turnover.

Not only can organic minerals support joint health by encouraging cartilage turnover, but they can also help prevent joint damage.

In horses, high-intensity exercise can induce inflammation and oxidative stress in the joints, which is linked to the progression of osteoarthritis.

Organic trace minerals can improve antioxidant capacity during exercise and enhance cartilage metabolism after inflammatory stimuli.

Feeding horses a diet consisting of 100% organic trace minerals could improve joint cartilage maintenance throughout the animal's lifetime.

3) Improved Hoof and Coat Quality

Supplementing with organic trace minerals has been shown to improve hoof health and hair coat quality.

Research on pigs shows that sows fed organic trace minerals had improved hoof health scores compared to those fed inorganic trace minerals. Likewise, a study involving 300 cattle showed a reduced incidence of hoof disorders in the group fed organic minerals.

In horses, yearlings fed organic trace minerals had higher rates of hoof growth compared to horses fed inorganic trace minerals.

A study looking at trace minerals in canine diets found that feeding organic minerals lead to smoother coats and less fragmented hair follicles.

A similar study in Thoroughbreds found that horses supplemented with organic copper and zinc had increased hair elasticity and strength.

Augusta Co-op Solution

Nutrena, SafeChoice Original Horse Feed, 50 lbs.

SafeChoice® feed contains quality ingredients, organic trace minerals, controlled starch and sugar levels, Topline Balance® with guaranteed amino acids, quality fat sources and probiotics.

SKU - 1316

Types of Organic Trace Minerals

Trace minerals can be bound to many types of organic compounds, resulting in several different forms of organic trace minerals.

Organic trace minerals are defined by the type of bonds found in the chemical structure or by the compounds that the minerals are bound to.

The **Association of American Feed Control Officials** defines the following types of organic trace minerals:

Metal amino acid complex: The combination of a mineral with amino acid(s). (e.g. Copper amino acid complex)

Metal (specific amino acid) complex: The combination of a mineral with a specific amino acid(s). The specific amino acid should be named in the ingredient list. (e.g. Copper methionine complex)

Metal amino acid chelate: The combination of a mineral with amino acids, where the mineral is bound to the amino acid via covalent bonds. (e.g. Copper amino acid chelate)

Metal polysaccharide complex: The combination of a mineral and a polysaccharide solution. (e.g. Copper polysaccharide complex)

Metal proteinate: The combination of a mineral with amino acids or partially hydrolyzed protein. (e.g. Copper proteinate)

Metal Methionine Hydroxy Analogue chelate: The combination of a mineral with 2-hydroxy-4-methylthiobutanoic acid (HMTBa) via covalent bonds.

Metal propionate: The combination of a mineral with propionic acid (organic acid). (e.g. Copper propionate)

Different Types of Organic Minerals

Organic trace minerals are only effective if the mineral complex preserves its form until it is absorbed in the small intestine.

The strength of the bond between the mineral and the organic compound can impact its bioavailability. An organic mineral with a high complex strength will remain in its original complex and have higher bioavailability.

Some organic trace minerals are unstable at lower pH levels, which are present in the gastric environment. These organic minerals may not pass through the stomach intact and may not reach the small intestine in their original form.

The instability of certain trace mineral complexes may be the reason why studies with organic trace minerals have been inconclusive. Currently, there are no regulatory standards in place to determine the strength or stability of organic trace minerals.

continued on page 3

Some research indicates that trace minerals in a proteinate form have higher bioavailability compared to amino acid complexes or chelated minerals.

Because of the greater efficiency of absorption of organic trace minerals, lower levels of organic trace minerals have been used in other species without negatively affecting the performance of the animal.

Identifying Mineral Sources on Your Feed Tag

Equine feeds are formulated with many different types of trace minerals, and it may not always be intuitive whether a product contains organic minerals, inorganic minerals, or a blend of both.

Organic trace minerals are more expensive for feed companies to use in their products.

Some companies market their feeds as containing organic trace minerals, but actually only use a small portion of organic minerals and make up the rest with inorganic minerals. For example, you might see a product with both copper sulphate and copper proteinate on the ingredient list.

This practice is called "window dressing," and it can reduce the cost of manufacturing a feed, but results in a lower quality product.

To ensure your horse is getting 100% organic trace minerals, review your feed's ingredient list and look for minerals with the following words: chelated, amino acid complex, proteinate, or methionine.

If you have any doubts about the types of minerals used in your horse's diet, our equine nutritionists can help.

The list below details some of the common organic and inorganic trace mineral sources used in equine feeds, ration balancers, and supplements.

Organic vs. Inorganic Trace Minerals List

Selenium

Inorganic ingredients: Sodium selenite, sodium selenate
Organic ingredients: selenized yeast, selenomethionine, selonocystein

Iron

Inorganic ingredients: ferrous carbonate, ferric chloride, ferrous sulphate
Organic ingredients: ferrous fumarate, iron proteinate, Bioplex iron, ferric ammonium citrate, ferric choline citrate

Zinc

Inorganic ingredients: Zinc sulfate, zinc oxide, zinc carbonate
Organic ingredients: zinc methionine sulfate, zinc proteinate, polysaccharide complex

Copper

Inorganic ingredients: Cupric sulfate, cupric chloride, cupric oxide, cupric sulfate, cupric carbonate
Organic ingredients: copper proteinate, copper choline citrate, copper polysaccharide complex

Manganese

Inorganic ingredients: Manganous sulfate, Manganous oxide
Organic ingredients: manganese proteinate, manganese polysaccharide complex

Iodine

Inorganic ingredients: Calcium iodate, potassium iodate, sodium iodate or iodide, cuprous iodide
Organic ingredients: Ethylenediamine dihydriodide (EDDI), seaweed meal whole dehydrate

Cobalt

Inorganic ingredients: Cobaltous carbonate, cobaltous sulfate
Organic ingredients: Cobalt proteinate, cobalt choline citrate, cobalt polysaccharide complex

*All organic compounds contain carbon, but some carbon-containing compounds are not organic.

Conclusion

Want to switch your horse to a diet providing organic trace minerals or need help identifying the mineral source in your horse's feed? Our nutritionists can help!

Linaya Pot, MSc

5 COMMON HORSE FEEDING MISTAKES

Every day, multiple times a day, you feed your horse. It's part of the lifestyle of owning horses, and we've all learned to appreciate the smell of freshly baled hay and molasses-flavored grain before we've had our own morning coffee.

And while you certainly take feeding your horse seriously, it's easy to overlook some keys to success. Below, we'll talk about five common mistakes you might be making and how to rectify the situation to improve your horse's gut health and overall well-being.

1. Feeding by scoop or flake instead of by weight.

Raise your hand if you have ever defaulted to the statement, "My horse gets a scoop of that."

If you've been a horse owner for any amount of time, you probably have your hand up. Everyone has made this mistake at one time or another, either with grain or hay ("He gets two flakes.").

Here's the problem with feeding horses by the scoop: Each concentrate or complete feed, while similar in volume, differs in weight. Commercial grain mixes are formulated to be fed at a specific rate; this information is always located on the bag or feed tag. Feeding rates ensure horses receive the correct ratio of micronutrients, such as vitamins and minerals, which are required in small amounts but have major health implications.

As for hay, one flake of grass hay, on average, weighs 3 to 5 pounds and one flake of alfalfa hay weighs 5 to 7 pounds. Given that a horse requires at least 1% of its body weight in hay or other forage every day, these 2-pound fluctuations in "flakes" can add up to a big difference in your horse's diet, which affects microbes in the gut that thrive on fiber found in forage.

Do this instead:

- Consult the feed tag for feeding rates based on your horse's age and activity level.
- Use a scale (it could be a small kitchen or luggage scale) to measure out the recommended amount of that particular concentrate or complete feed.
- Pour that grain into the scoop you use so you know how much you need to feed each day. Don't forget to zero-out the scale first. Divide into the number of times per day you feed and voila! you know exactly how much grain you must give your horse each feeding for optimal nutrition in scoops. "Consider a single meal of grain to be offered at 0.5% (and up to 0.75%) of the horse's body weight," says Leatherwood. If you change the scoop you're using or switch grains, repeat this process. Once you measure it out by weight once or twice, you won't have to use the scale.
- Weigh a few flakes of each batch of hay so you know how much they weigh or if the weight fluctuates. Of course, this varies by bale, so don't get too obsessive. If you are new to this, weigh flakes periodically to get an idea of what different weights feel like. This practical step will help you offer your horse a consistent amount of hay; with time, your arm will start to become your scale.

2. Feeding senior feed unnecessarily.

A common mistake horse owners make is feeding senior feed to a horse that does not yet have a need for it. While it shouldn't cause health problems, senior feed is designed to be used as a complete feed. Complete feeds include the fiber portion of a horse's diet and are designed to be fed to older horses who can no longer chew or digest hay.

"Just being old doesn't mean a horse requires a senior feed," explains Brian Nielsen, PhD, PAS, Dipl. ACAN, professor of equine nutrition and exercise physiology at Michigan State University, in East Lansing. "Research done at Michigan State University (Elzinga et al., 2014) revealed that there are no major differences in the ability to absorb macronutrients between older horses (19-28 years) and younger adult horses (5-12 years). This means that there is no need to have a horse on a senior feed simply because they are getting old. However, if your older horse has poor dentition or other problems related to aging, senior feeds can be a wonderful tool to improve the health of your horse."

Rather than classifying an animal as senior based on his numeric age, consider aging a horse by his physiological changes. One telltale sign is failing dentition and the inability to consume hay efficiently. For this reason, senior horse feeds are formulated to be fed at very high feeding rates, typically upward of 10 pounds per day to account for the forage portion of a horse's diet.

If you are feeding a nonsenior horse a scoop of senior feed, you're doing him a disservice by not meeting his micronutrient requirements.

Do this instead:

- Ask yourself why you're feeding your horse a senior feed. Is it just to give her a grain treat? Is it for added calories and energy?
- If you are using senior feed as a treat, a better option might be a ration balancer, which you can feed at low rates of 1 to 2 pounds per day while offering your horse all the required vitamins and minerals. If your horse needs added calories, fat, protein, or energy, choosing a performance horse feed designed to be fed at 3 to 7 pounds per day might be a better option.
- Talk to an equine nutritionist to be sure your horse's hay and grain are meeting his nutrient requirements.

continued on page 5

3. Overestimating how much work your horse does.

Considering domestic horses evolved from wild predecessors who traveled 20 to 30 miles per day to meet their feed and water needs, it's clear that most domestic horses are not getting as much exercise as they used to. Further, we tend to overestimate the amount of exercise they do get.

While an unpopular opinion among some, it's better to be able to see a hint of a horse's ribs than fat deposits.

"It is challenging to have horse owners feed their horse in a manner that encourages an appropriate body condition score, as people are used to seeing overweight horses and believe it looks good," says Nielsen. There is an old saying that 'fat hides a lot of sins.' A large number of individuals in the horse industry believe they are knowledgeable but often mistake a horse that is fat for one with good muscling. That being said, it has been known for about 100 years that calorie restriction can lead to a longer life.

"As often happens with horses, dogs, and other pets, many people fall into the trap of 'killing them with kindness' by allowing their animals to become overweight," he continues. "Many health problems could be avoided if horse owners were more diligent in regulating the body condition score of their animals."

Nielsen is not advocating for skinny animals but, rather, bringing awareness to the fact that fat horses are at significantly higher risk for developing serious and painful health conditions than a slightly ribby horse.

Do this instead:

- Get real about and classify your horse's activity level based on the National Research Council's Nutrient Requirements of Horses recommendations. Keep in mind that most horses fall into the light or moderate work category.
  - **Maintenance:** Nonworking horses
  - **Light work:** 1-3 hours of work per week
  - **Moderate work:** 3-5 hours of work per week
  - **Heavy work:** 4-5 hours of work per week with significant amounts of time spent cantering
  - **Very heavy work:** 6-12 hours of work per week
- Feed at rates that match your horse's true activity level and increase the ration based on his metabolism.
- Be cognizant of a horse that is putting on too much weight or getting too thin. Aim for a body condition score between 4 and 6, and adjust the amount you feed accordingly. Remember, if you change your grain or hay rations, weigh them and feed at a rate that meets your horse's micronutrient requirements.

"If a horse is no longer performing well on feed, go back to your forage source first and evaluate both the quality and quantity that you are providing," adds Leatherwood. "In some cases a horse might not require additional grain but, rather, a higher-quality fiber source."

continued on page 6

4. Over supplementing or changing supplements frequently.

If you're currently feeding your horse Betty-Crocker-style (i.e., mixing up a whole recipe of grain and supplements at mealtime), you could be doing more harm than good.

A bunch of supplements that were not designed to be fed together can create competitive inhibition and interactions between macro- and micronutrients in the horse's gastrointestinal tract. For example, excess zinc in a horse's diet can negatively impact the body's ability to absorb and use copper. It's all a balancing act.

At the very least, this means some or most of what you're feeding your horse might not be used, translating to wasted money. At worst, your horse's body is overwhelmed and not absorbing the nutrients it needs.

"Supplements are one of the ways in which horse owners often waste money," says Nielsen. "The number of supplements on the market that have never been proven to do anything far exceeds those that have been proven to be -efficacious."

Do this instead:

- If you are feeding more than two supplements, work with an equine nutritionist to make sure the products don't have negative interactions and/or side effects when used together.
- When adding a new supplement to a horse's ration, be sure to give it ample time to work. In many cases supplement companies say it takes a minimum of 60-90 days to realize a product's full benefits. Don't give up too quickly or change supplements too frequently, which could cause GI upset and overwhelm the horse's body.
- If you decide to make changes to your horse's diet, be they in the form of hay, grain, or supplements, do so slowly to minimize digestive disturbances. Leatherwood suggests "a seven- to 10-day transition period in which you add and replace 25% old with 25% new hay or grain. For example, you might feed 25% new with 75% old for two to three days, then 50% new with 50% old for two to three days, and finally 75% new with 25% old for two to three days."

5. Feeding in meals instead of continually.

Horses' digestive tracts were designed for slow, continuous feeding rather than the two to three meals per day the domestic lifestyle has normalized. While constant feeding isn't typically conducive to human schedules, you do have options.

Do this instead:

- Find a way to offer your horse the most natural lifestyle possible. Some ideas include slow feeders or haynets or keeping your horse on pasture for as many hours per day as is appropriate.
- Invest in automated feeding stations that distribute customized amounts of feed and forage to individual horses at multiple intervals throughout the day.

Take-Home Message

As horse owners, we're always trying to do our best for our horses, including at feeding time. Just like our diets sometimes need a tune-up, these recommendations can serve as the level-up you need to ensure your horses' optimal health.

You might be surprised at the differences you see in your horse's attitude, condition, and performance when you tighten the nutritional bolts.

EVENTS / CALENDAR

TO VIEW ALL CALENDAR EVENTS, SCAN THE QR CODE.

ROAD TO THE RING

Wednesday, November 1 | 5:30 PM - 8:00 PM

Blue Ridge Community College – Plecker Center
1 College Ln. | Weyers Cave, VA 24486

A hands on experience designed for all 4-H/FFA Livestock Showmen. Presenters will inspire you to obtain the skills and techniques needed for success in the show ring! Become a better livestock showman, marketer, herdsman and learn the latest in nutrition and overall animal health.

RSVP required to Allison Bagley ABagley@AugustaCoop.com. Dinner will be provided.

Please note: Road to the Ring will be hosted at a NEW location this year.

BLACK FRIDAY SALE

Friday & Saturday, November 3-4

Augusta Co-op - Staunton location only
1205B Richmond Ave | Staunton, VA 24401
30% off all clothing.

AGRONOMY CUSTOMER APPRECIATION DAY

Friday, February 9 | 11 AM - 2 PM

Augusta Expo - Building 2
277 Expo Rd, | Fishersville, VA 22939
Additional information: RSVP to Staci Alger at (540) 885-1265 x 253 or SAlger@AugustaCoop.com

VENDOR DAY

Wednesday, February 21 | 4 PM - 8 PM

Augusta Expo - Multipurpose Building
277 Expo Rd, | Fishersville, VA 22939
The largest farming brands on site in one location! Book your 2024 items at drastically reduced rates at our annual vendor day! Door prizes, food, educational seminars and much more! Visit AugustaCoop.com for more details. *Full list of sale items available February 9, 2024 on AugustaCoop.com/events.

4TH IN THE NATION

among ag banks and the 30th largest agricultural lender among all U.S. commercial banks.

Keith Phillips
Harrisonburg

Bradley Webb
Harrisonburg | NMLS# 491101

David Kiracofe
Bridgewater | NMLS# 491081

Ashlie Howell
Verona | NMLS# 571338

Emma Brown
Harrisonburg | NMLS# 1687152

Bradley Dunsmore
Staunton | NMLS# 1040561

Josh Phillips
Harrisonburg

Sheldon Waldron
Harrisonburg

Our local, experienced team is here to assist you with the financial needs of your operation.

First Bank & Trust Company

First Bank and Trust Company offers flexible financing solutions for Agricultural Operations.

✓ Land and Real-estate Loans ✓ Equipment Loans ✓ Loans for Livestock and other operations ✓ Operating Lines of Credit ✓ Mortgage Loans: Construction-to-Permanent, Rural Development, Renovation and more.

Bridgewater
610 B North Main St.
540-246-0003

Harrisonburg
120 University Blvd.
540-437-0604

Staunton
1030 Richmond Rd.
540-885-8000

Verona
1563 Commerce Rd.
540-248-7700

www.firstbank.com/ag | Member FDIC |

**Ag loans and loans secured by farmland equal or exceed 25 percent of total loans. FDIC Data as of June 30 2022.*