

# Questions and Answers: Sel-Plex for horses

**Q**  
What is Sel-Plex?

**A**  
Sel-Plex is organic selenium from yeast. Yeast form the same kinds of selenium compounds that plants produce, which is the form that horses and other animals evolved to consume.

What is the difference between Sel-Plex and sodium selenite?

Sodium selenite (and selenate) are inorganic mineral forms, which until recently were the only selenium sources in use as feed supplements. These inorganic mineral forms are a by-product of copper mining, and are chemically identified as  $\text{Na}_2\text{SeO}_3$  and  $\text{Na}_2\text{SeO}_4$ .

The principal difference between Sel-Plex and inorganic selenium sources is the way in which they are metabolized. The organic forms in Sel-Plex, predominantly selenoamino acids and related compounds, are more easily digested, metabolized and retained in tissues by horses and other animals, including humans.

What are recommended levels of selenium in diets fed horses?

NRC suggests 0.1 ppm Se in the total diet for all ages and classes of horses. While most agree that 0.1 ppm Se is sufficient for mature idle horses, requirements for performance horses, growing horses and mares are probably higher - on the order of 3 mg/day. This amount equates to about 0.3 ppm Se in the total diet and is the amount added by many feed manufacturers. Sel-Plex is cleared for addition at 0.3 ppm.

Don't forages and grains contain selenium?

Selenium content of forages and grains varies among regions of the country. While a few areas in the northern Great Plains have very high soil selenium content, much of the corn and soy-producing region of the US is low in Se. In general, crops and pasture in the eastern half of the US are low in natural selenium, as are those in the Pacific northwest. We add selenium supplements to animal feeds to insure adequate intake despite soil and crop variations.

Why do horses need selenium?

Selenium has several roles, but the most well-known is as a key element in antioxidant defense, which makes it important in every cell in the body as well in immune defense. The body produces radical oxygen metabolites (ROM) as a normal consequence of oxygen metabolism. Selenium-requiring enzymes such as glutathione peroxidase (GSH-Px) neutralize ROM, rendering them harmless and protecting cellular machinery from damage.

Other basic processes requiring selenium for normal function include growth, disease defense and reproduction. Selenium-supplemented foals are known to grow better than Se-deficient foals, possibly because a Se-dependent enzyme is needed to activate thyroid hormone. In addition, both males and females require selenium for reproductive function.

Why do horses need selenium?

Exercise increases oxidative metabolism markedly, which results in mobilization of tissue Se to meet increased antioxidant demand. This explains why performance horses (and human athletes) have greater selenium needs than non-athletes.

In an experiment comparing selenium balance in trained Thoroughbreds given selenite or Sel-Plex, those given Sel-Plex digested and retained more selenium. In addition, exercise onset increased blood selenium of all horses, however more was lost via urine in horses given selenite. The ability to maintain a more positive selenium balance despite increased demand leaves the athlete better able to cope with the effects of maximum aerobic work.



## Q Is Sel-Plex more or less toxic than inorganic selenium?

Although more digestible than inorganic selenium, selenium in Sel-Plex form is actually much safer both to horses and humans. The organic selenium compounds that plants and yeast produce are nature's way of providing a potentially toxic element in a safe form. Selenoamino acids are absorbed from the gut via amino acid pathways, which necessarily limits excessive uptake. In contrast, selenite Se is passively absorbed, which allows rapid and unregulated uptake of toxic levels of selenium.

Sel-Plex Se is also much safer to handle by those mixing feeds. Sodium selenite is extremely toxic because it is absorbed through the skin. In contrast, the selenocompounds in Sel-Plex are not absorbed on contact, which increases safety against the most common selenium toxicity problem: exposure to human skin in laboratories and feed mills.

## How does Sel-Plex benefit the broodmare herd?

Delivery of a healthy foal, prompt and complete expulsion of the placenta, avoidance of metritis and other periparturient infections and timely cycling and re-breeding are all required for reproductive success. Following parturition, optimum response of the mare's cell-mediated immune system is needed for clean separation of the placenta at the tissue level. In addition, this important branch of the immune system is critical in stopping establishment of invading pathogens.

During the last trimester of gestation, the mare transfers a tremendous quantity of trace minerals to the fetus, which without optimum nutrition places her at risk of depleting reserves. Production of colostrum and the onset of lactation place further demands on mare nutrient status. Selenium in Sel-Plex form lets the mare build tissue reserves that leave her able to meet gestation and lactation needs without compromising her own health.

## What are the benefits of Sel-Plex for foals?

Selenium is needed for both innate (non-specific) and acquired (antibody-mediated) immune function. In addition to nutrients transferred during gestation, good quality colostrum supplies high levels of immunoglobulins (IgG, IgM and IgA), vitamin E and selenium to prepare the foal to fight infection while milk provides lower amounts. The need for selenium in formation of maternal antibodies is reflected in higher quality colostrum. Foals born to mares given 3 mg instead of 1 mg Se daily had higher serum IgG content at 12 hrs of age, particularly when the source of selenium was Sel-Plex.

The innate immune response is active from birth, and is the first line of defense against pathogens. Effector cells, which include neutrophils and macrophages ('white blood cells') require selenium in its antioxidant enzyme role for efficient function.

Benefits to the foal continue throughout nursing in the form of higher milk selenium content when the mare receives Sel-Plex. Improved foal selenium status also spares vitamin E, which leaves the foal better prepared for weaning stress.

## Can the mature, idle or geriatric horse benefit from Sel-Plex?

Non-active or non-reproductive horses are assumed to have lower selenium needs. In regions where forages and grains contain some amount of organic selenium, addition of 1 mg daily to complete feeds is sufficient.

While antioxidant status is associated with many aspects of age-related decline in all species, whether the requirement for selenium actually changes is not known. Importantly, however, the ability of horses to extract nutrients from feed does decline with age. In diets fed geriatric horses, Sel-Plex is of value in ensuring an easily available supply of this critical nutrient in a form the animal can store and mobilize.



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