

Considerations When Purchasing All Stock Feeds for Horses
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The title of this article seems like a "common sense statement" to most educated individuals. However, many horse owners are challenged with the numerous options to purchase concentrate mixes for horses that may violate the statement made in this title. Within the past two years, an increased number of commercial feeds manufactured in North Carolina are being marketed with livestock feed tag labels recommended to be fed to a wide variety of farm animal species including horses, cattle, goats, sheep and even rabbits. The feed tag for a concentrate mix must also include the minimum amount of protein, calcium, phosphorus and in some cases, ash, a combination of minerals. The tag must also list a maximum level of fiber and calcium for horses and may also include feed intake recommendation on the feeding labels or feed bag. Additional information on other important nutrient content includes digestible energy, remaining macro minerals, trace minerals and vitamins are not required by law. Consequently, feed companies that market one feed supposedly balanced to meet the nutrient needs of several animal species are not required to list the nutrient content for all the nutrients.

The National Research Council (NRC) provides minimum nutrient requirements for each of the farm species. The development of those requirements are the result of years of work by committees reviewing the scientific literature to confirm the acceptable range of all the major nutrients for each farm species. A quick review of those nutrient requirements will show some significant differences among the farm species in nutrient requirements. This is especially true of the trace minerals iron, copper, zinc and the macro minerals, calcium and phosphorus requirements for equine, which are non-ruminant herbivores when compared to cattle and sheep, which are ruminants. In addition, levels of nutrients also vary for each species including the horse (Table 1). For example, an excess level of iron will interact and reduce the absorption level of calcium and phosphorus from the digestive tract. By comparison, if the iron level is fortified correctly to meet the minimum requirement in ruminants, it may be excessively high if the same concentrate mix is fed to equine. The end result of such interaction and reduced mineral absorption could be increased incidence of lameness due to bone, ligament and tendon damage; decreased milk production in lactating mares; reduced metabolism of energy and other implications. Although iron toxicity is rare in horses, high levels of iron based supplements have been toxic to young animals, especially foals. In addition, iron is readily available in forages grown in high iron soils located throughout North Carolina. The maximum tolerable concentration of iron is 500mg/kg according to the NRC, 2007. There is a great deal of variability in the levels of minerals supplemented by forages. In general, forages grown on high iron soils can supply up to 80 to over 100 percent of this amount. In such cases the iron content supplemented by the concentrate mix, if over fortified, would significantly exceed the NRC requirements for equines.

In this example I choose to compare only one nutrient; iron. Similar imbalances can exist between other nutrients. The take home message is not to try to force one

concentrate mix to meet the nutrient requirements for horses at various production stages or multiple species that have significantly different nutrient requirements. The opportunity for reduced availability of nutrients resulting from interactions is increased when supplementing forages with improperly fortified concentrate mixes. Select concentrate mixes specifically designed for equines for the correct production stage. Follow the feed intake directions and feed high quality forages as either pasture and/or hay.

Table 1.
Daily Mineral Requirements of the Horse (Mature Body Weight 1,100 lbs.)^{1,2}

Equine Production Stage	Ca³ (g)	P³ (g)	Fe³ (mg)	Cu³ (mg)	Zn³ (mg)
Adult Non work	20	14	400	100	400
Working					
Light Exercise	30	18	400	100	400
Moderate Exercise	35	21	450	112	450
Heavy Exercise	40	29	500	125	500
Pregnant Mare					
6 months	20	14	400	100	400
11 months	36	26	500	125	400
Lactating Mare					
1 st month	59	38	625	125	500
Growing					
4 months	39	22	211	42	169
6 months	39	22	270	54	216
12 months	37	21	402	50	321
24 months	37	20	536	107	492

¹ Nutrient Requirements of the Horse. 6th Revised Edition. 2007 National Research Council. The National Academies Press. Washington, DC. pp 298-299.

² Daily requirements for Fe, Cu and Zn were calculated assuming 2.5% of body weight for heavy exercise, lactating mares and growing horses; 2.25% of body weight for moderate exercise and 2% for all other classes.

³ Calcium (Ca), phosphorus (P), iron (Fe), copper (Cu), zinc (Zn).