

Rice Bran and the Performance Horse

Maintaining weight in a hard-working horse can be a real challenge, and trying to find an optimal, high-calorie ration is often confusing, expensive, messy or a combination of all three. In the past few years, rice bran has become a popular feed among performance horse owners seeking to maintain both weight and a glossy coat throughout a busy season. However, as with many feeds, rice bran has its drawbacks as well as assets. Its inclusion into equine rations will produce the most profitable benefits to health, performance and the owner's pocketbook when used with a little education and understanding.

The primary attraction to rice bran, aside from its palatability and convenience, is that it is marketed as being a source of fat---and rice bran does indeed contain fat levels of between 14 - 23% depending on the extent of processing. Fat is the most energy-dense nutrient available, and therefore rice bran would seem to be an obvious choice for inclusion in the performance horse ration. But does fat content alone make rice bran a superior feed?

Before choosing rice bran as a component in the ration, it is important to understand the differences between types of rice bran. Although relatively new on the equine market, rice bran has been a by-product of rice production for many years. Until effective processing and stabilization techniques were developed, raw rice bran was formerly discarded as a low-quality animal feed, ironically due to the fat content which is considered its greatest attraction. Once the bran layer is removed from the rice, the fat content rapidly becomes oxidized and rancid, greatly decreasing its value as a food for either animals or humans. In recent years, processing technology has advanced to stabilize the fats in rice bran so that the rate of oxidation is greatly reduced, increasing the shelf life to more than a year. While stabilization does not solve all of rice bran's possible drawbacks, it does separate raw rice bran from the stabilized forms available on the market, to the extent that they can almost be considered a different feed altogether.

When considering rice bran for the energy it provides, it's not just the fat content which is important in choosing appropriate feeds, but total calorie content. A look at a feed's energy (calorie) content compared to other feeds is a helpful first step:

	Energy content (Mcal/lb)	Energy content comparison to 20% rice bran
Bermuda hay, (29-42 days growth)	.83	48%
Timothy Hay	.85	49%
Alfalfa hay, early bloom	1.02	59%
Beet pulp (dry)	1.28	74%
Oat grain	1.33	77%
Wheat bran	1.34	78%
Rice bran, 15% fat	1.44	84%
Corn grain	1.58	92%
Rice bran, 20% fat	1.72	100%
Vegetable oil	4.08	237%

The above table illustrates that 20% rice bran ranks higher in calories than any of the forage feeds or grains, and slightly less than half of that of pure vegetable oil. As such, rice bran does provide significant calories on a pound for pound basis. However, feeds are not necessarily fed in equal amounts--no horse owner would feed as many pounds of a concentrate as they do hay under normal circumstances, and fats can normally only be fed in fairly limited amounts. It is important to understand that, rather than feeding a relatively small amount of a concentrate, more total calories might be provided by supplying a feed which can be safely consumed in much larger amounts.

For example, notice that beet pulp has 74% of the energy content of rice bran--in other words, 1.3 pounds of beet pulp equals the calories in one pound of rice bran. While rice bran is the more energy-dense of the two feeds, beet pulp can safely be fed in amounts up to 45% of the total ration, while grain products (including rice bran) cannot---thereby supplying more total calories in the ration.

However, there are many circumstances when feeding a dense source of calories (or specifically, fat) is necessary. Feeding vegetable oils still provides the most calories compared to any feed, and one cup of oil is equivalent in energy to .85 pounds of rice bran, generally for significantly lower cost. However, while vegetable oil provides the most calories per pound, many owners dislike its relative messiness. Oils must also be guarded closely against rancidity and many horses object to the texture in their feed. In these instances when only a relatively small amount of fat is required, rice bran does provide a source of calories which is both convenient to feed and generally highly palatable to the horse.

However, before feeding more than a pound or two of rice bran, horse owners should understand the primary drawback, (as well as the one most commonly overlooked) which is its inherent mineral imbalance. Rice bran contains 0.02% calcium and 1.50 - 1.70% phosphorus, the highest organic source available. Calcium and phosphorus are only two of the many minerals which share an interrelationship in nutrition. While excess calcium in the diet has relatively little effect on the absorption of phosphorus, excess phosphorus in the diet will bind and prevent absorption of calcium. Thus, even though the diet may contain sufficient calcium, if adequate amounts are not absorbed, the results are as if the diet were deficient in calcium to begin with. A ration which contains more phosphorus than calcium is referred to as being "inverted" and may have serious effects on health.

For example, a horse eating 18 pounds of bermuda hay is being provided with approximately 25 grams of calcium and 16 grams of phosphorus, or a ratio of 1.56 (1.56 grams of dietary calcium for every 1 gram of phosphorus) which is a very good balance. Equine nutritionists recommend an ideal calcium-phosphorus ratio of between 1.2 - 2. Any ratio less than 1 is considered inverted and a serious imbalance in the equine ration.

Now add to this above ration five pounds of corn and the ratio drops to 1.18---just a touch below the recommended level, but still acceptable. But what if we add just two pounds of rice bran? Now the ratio drops to .74---inverted and absolutely unacceptable. This means that for every day that this ration is fed, a significant calcium deficiency exists, despite apparently adequate amounts being supplied in the diet. In order to make up for the deficiency, the body will

compensate by mobilizing calcium from storage depots in the bone. Over the lifetime and career of the horse, this may contribute to a decrease in bone density, as well as decreased calcium availability for muscular contraction during exercise. In a young, growing horse, an inverted ratio may also contribute to developmental orthopedic diseases.

Balancing this inverted ratio has been approached in different ways by manufacturers of stabilized rice bran. The manufacturers of Equi-Jewel® include limestone, an inorganic and highly bioavailable source of calcium, into their formulation to return the calcium-phosphorus ratio to an acceptable level. The manufacturers of the rice bran product Natural Glo® provide calcium by marketing an additional Gro-Strong® mineral supplement which can be added as a top dressing to correct calcium-phosphorus inversions. While either solution solves the immediate problem of a mineral imbalance, it does not avoid the secondary issue of excessive minerals. As long as both calcium and phosphorus are supplied in the correct ratio, and in adequate amounts, excessive amounts within reasonable limits are not a major cause for concern. If rice bran is fed in large amounts (significantly more than one or two pounds a day), then the amount of calcium required to balance the phosphorus may in turn have an effect on the absorption of other necessary minerals, such as zinc, manganese and ironically, phosphorus.

In addition, excess calcium may cause increased production of the calcium-regulating hormone calcitonin, which is responsible for putting calcium into the storage depots of bone. A concurrent decrease in parathyroid hormone, which is responsible for mobilizing calcium from bone into the plasma when required, may result in inadequate calcium being immediately available during sustained exercise, such as eventing, competitive trail riding or endurance competition. Thus, the incidence of performance-related syndromes, such as synchronous diaphragmatic flutter, ("thumps") may be increased. In young, growing horses, excess calcium may also contribute to an increased incidence of developmental orthopedic disease.

Owners of performance horses who compete in endurance-type competition may think, "Fine--- we won't feed rice bran every day, just before and during a competition so the fat will help maintain energy." In fact, rice bran's fat content (or any other source of fat) is a disadvantage during sustained exercise. Fat slows gastric emptying and therefore, the food ingested at vet checks will not be digested and metabolized as quickly as feeds with a low fat content. Not only will the fat-containing feed be slow to leave the stomach, it will also slow the digestion of other grains, electrolytes and roughages needed to maintain gut motility, energy and fluid balance during competition. Furthermore, fats themselves are metabolized much more slowly than are carbohydrate sources, such as grains. Since from 50-70% of rice bran's energy content is in the form of fat, relatively little energy is going to be available to the horse during the competition directly from the rice bran. For these reasons, hay and grain are a better choice to maintain energy levels, as well as gut motility and fluid balance, during competition.

Feeds that are deficient in one area are often an above-average source of another nutrient. In this respect, rice bran is no different in that it is an excellent source of the fat-soluble vitamin E, higher than that of any other grain source. Vitamin E has received increased attention in equine nutrition research in recent years as an antioxidant, an aid to the immune system and in the prevention of performance-related syndromes, such as exertional rhabdomyolysis ("tying up"). Rice bran also contains significant amounts of tocotrienol, a form of vitamin E which may have

extremely potent antioxidant properties. However, tocotrienol is also oxidized and rendered useless to the body unless stabilized almost instantly, and currently reliable data has not been made available to either verify or disprove its content in rice bran. While rice bran remains a good source of naturally-occurring vitamin E, synthetic sources such as tocopherol acetate are also readily and inexpensively available and are well absorbed and utilized by the body.

Rice bran is also a source of the naturally-occurring substance gamma oryzanol, which has been purported to have both antioxidant and steroid-like properties which help performance horses build muscle tissue. Gamma oryzanol is also marketed in a purified form under several brand names, and is particularly popular among race trainers to help Thoroughbred racehorses develop lean muscle tissue quickly. However, some equine veterinarians have reported an increased incidence of gastric ulcers in young horses fed gamma oryzanol either as rice bran or as a purified supplement. Although no controlled studies have been published, this aspect should be considered before feeding any source of gamma oryzanol to young horses.

In conclusion, rice bran is, in many ways, just like every other supplement, feed and grain mix among the hundreds available. It has both good and bad points and while a "magic bullet" for one horse, it may be useless or even detrimental to other horses under different circumstances. As always, knowledge, experience and a clear head to see past marketing promises will be an owner's best tool in making an informed and intelligent decision.

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