Online: http://www.admani.com/AllianceEquine/FeedingFats.htm

Fats and Oils as Concentrated Energy Sources

by Judy Reynolds, PhD., P.A.S.

The type and amount of grass and hay should be selected to provide as much of a horse's energy requirement as possible. But, when forage alone will not meet energy needs, fats and/or grains should be fed.

Even though grains are the traditional sources of extra energy in horse rations, there are many reasons to choose fats over grains. Fats provide 2¼ times as much energy per pound as grains, allowing you to supplement forages with fats, rather than replacing forages with grains. Also, horses fed fats are less likely to suffer from digestive and metabolic disorders, such as colic, founder, tying-up and gastric ulcers than horses fed large amounts of grains.

Typical forages contain about 1% fat and grains contain about 3 to 5% fat. However, research has shown that fats and oils can be fed at up to 15% of the total ration or 3 to 4.5 pounds of pure fat per day.

It is very unlikely you will ever need to feed that much fat in order to meet your horse's energy needs. Corn oil, soybean oil, and stabilized rice bran, which contains over 20% fat, are efficiently digested by horses and are excellent sources of energy.

Pure vegetable oils are not water-soluble. They mix better with other digestive contents when included in a grain mix or pelleted feed than when top-dressed over feed. Stabilized rice bran is water soluble and very digestible, so it can be fed alone, top-dressed, or mixed into texturized or pelleted feeds.

So remember, fats are beneficial sources of energy that allow you to feed more forage and also reduce your horse's risk of colic and founder. Choose forage and fats for your horse's health.

Fat Sources for Horses

Judith A. Reynolds, Ph.D., P.A.S., Divisional Equine Nutritionist

Fats, in general, are highly digestible (76 to 94%) by horses when added at up to 15% of the total ration. Fats are used to increase the caloric density of horse rations without as much risk of metabolic disorders caused by fermentation of starch from grains. Now that fats are widely accepted as energy sources for horses, the new focus is on comparison of available fat sources.

Animal Fats

- **Provide about 3.61 Mcal/lb digestible energy (DE) as fed.**

- **Are the cheapest source of dietary fat.**
- **Are usually less palatable that vegetable oils.**
- **Are less digestible and more hydrogenated than oils.**
- **Contain more impurities.**
- **Can become rancid if not preserved.**
- **Do not have ideal fatty acid profiles for horses.**

NOTE: New, highly refined powdered animal fats are now being developed. They are more palatable and digestible than other animal fats, but also cost more.

Vegetable Oils

- **Provide about 4.09 Mcal/lb DE (or 1.9 Mcal DE per cup as commonly fed).**

- **Are more expensive than animal fats per Mcal DE.**
- **Of the vegetable oils, corn and soybean oils are the most palatable for horses.**
- **Are 100% fat. Therefore, additional protein, vitamins, and minerals must be provided along with the added fat so that the total ration is not diluted of these nutrients when the oil is added.**
- **Are messy to feed and must be fed with some grain.**
- **Often don't mix well with pellets.**
- **Some horses will not eat top-dressed pure vegetable oils.**

Recent research indicates that pure oils might reduce the prececal digestion of starches in grains when large amounts of grains are top-dressed with oil. This can result in disruption of the microbial populations in the hindgut and disorders such as colic and founder.

Rice Bran (source of rice oil)

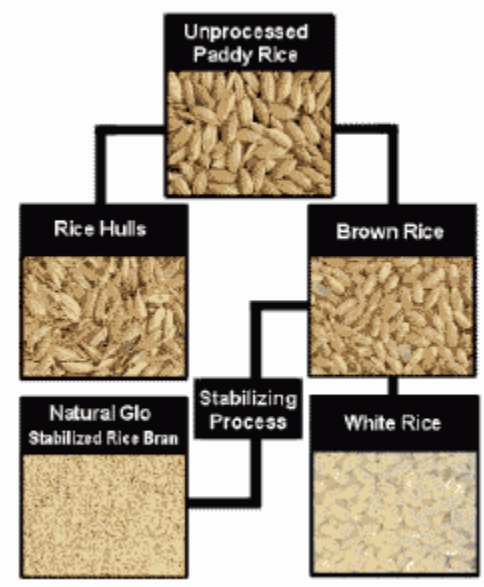
Raw rice bran — Most books and articles about horse nutrition that were written prior to 1990 have no reference to rice bran as a horse feed. That is because raw rice bran goes rancid very quickly (in as little as 24 hours), is frequently contaminated (dirt, hulls, bacteria, mold), and has never been considered to be a safe horse feed by most

What is Rice Bran?

by Rukmini Cheruvanky, Ph.D., FACN

World rice production is more than **500 million metric tons** per year and constitutes more than a quarter of all cereal grains. Rice is the staple food for a large portion of the world's population and has provided the nutritional basis for some of history's greatest civilizations. The peoples of Asia, South America, much of Africa, and portions of Europe, the Near East, and North America depend upon rice for daily sustenance. However, ineffective stabilization technology has caused the rice bran, which contains **more than half** of the nutritional value of every year's rice crop to be thrown away or disposed of as a low value animal feed.

When harvested from the field, rice is in the form of paddy (or "rough") rice, where the kernel is fully enveloped by the rice hull. After being dried, the hull is removed in the first stage of milling, yielding brown rice. In the second stage of milling, the outer brown layer is removed to produce white rice. The outer brown layer, called "rice bran," is composed of the rice germ and several sub layers which account for approximately 8% by weight of paddy rice and contain over 60% of the nutrients found in each kernel of rice.



Because of the difficulty of stabilizing rice bran, almost all of the **40 million metric tons** produced every year has been discarded as unfit for human consumption. In effect, over half of the effort and resources used to cultivate rice throughout the world has been lost because of our inability to stabilize rice bran after it was milled.

Rice bran is a rich source of hypoallergenic protein, oil, dietary fiber, and nutrients essential to life. Rice bran is unique in the plant kingdom. It is the only major cereal that contains all of the essential amino acids, the necessary building blocks of all protein in the body.

Rice bran contains 18-23% oil, which is high in polyunsaturates and monounsaturates and is extraordinary in heat stability. Rice bran oil contains significant amounts of the essential fatty acids, linolenic acid, and linoleic acid that are necessary in order to maintain full health as well as a broad range of nutraceutical compounds that have been demonstrated to have remarkable therapeutic properties.

Nutraceuticals are natural compounds that have therapeutic effects on human systems. Some of these compounds, including a newly discovered complex of Vitamin E called "tocotrienols," and gamma oryzanol, which is found only in rice bran, have been demonstrated to moderate blood serum cholesterol and reduce triglycerides in hyperlipidemic individuals. Tocotrienols are being investigated for anti-cancer properties in a broad spectrum of different cancers. These compounds are potent antioxidants that protect the body from free-radical damage.

Rice bran also contains very high concentrations of B-complex vitamins. The B vitamins are vital to the health of the entire body but especially for the health of the nervous system and brain. Rice bran also contains beta carotene, a precursor of Vitamin A, and other carotenoids as well as most of the important minerals (low in Ca) and fiber.

Processing of Rice

Under normal milling conditions, when brown rice is milled to white rice, the oil in the germ and a potent lipase enzyme found on the surface of the bran come into contact with each other. The lipase enzyme, causes very rapid hydrolysis of the oil, converting it into glycerol and free fatty acid (FFA) and quickly renders it unsuitable as a food or animal feed. As the free fatty acid content increases, the rice bran becomes unpalatable. At normal room temperature, the FFA concentration increases to 7-8% within 24 hours, and, thereafter, increases at the rate of approximately 4-5% per day. **Rice bran is unfit for human consumption when FFA concentration increases above 5%, typically within 12 hours of milling. Once the FFA concentration exceeds 12%, it becomes unsuitable even for cattle feed, the lowest economic use available to most crop byproducts.**

Heat, which will deactivate the lipase enzyme, serves as the basis for most stabilization processes. Parboiled (or “converted”) rice is subjected to soaking and steaming prior to being dried and milled. This process softens the rice kernel and reduces the problem of lipase-induced hydrolysis. The bran produced from parboiled rice, however, is only semi-stabilized and can spoil in 20 days or less. The parboiling process also destroys most of the intrinsic nutritional value of the bran by destroying or leeching out the beneficial nutrients residing in the bran.

There have been numerous attempts to develop alternative rice bran stabilization processes that deactivate the lipase enzyme using chemicals, microwave heating, and variants on extrusion technology. However, we have succeeded in creating truly stable rice bran while maintaining nutrient values. During our process, the bran is sterilized, a process that kills the fungal and microbial spores, rendering the rice bran safe for human consumption or as an animal feed. Independent analyses have determined that **NATURAL GLO® Stabilized Rice Bran** has FFA and peroxide levels that are significantly lower than other rice brans immediately after processing and remain much lower over time.