



SciencePure Nutraceuticals Inc.
PUREFORM Equine Products

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FLAX & YOUR HORSE:

Performance horses expend a tremendous amount of energy in their work. A mature horse at an average weight of 1100 pounds will require 25,000 - 30,000 calories per day, during the competitive season. It is virtually impossible to obtain this level of calories from forage, as we well know. Thus, grains are fed at varying levels and combinations up to but not recommended to exceed a 50/50 ratio with forage. Some horses have a difficult time handling this much grain, due to intestinal disturbances and or attitudinal problems. Others, with high metabolic rates, (hard keepers) or who are traveling constantly still cannot keep the weight on even with the maximum grain intake.

The inclusion of additional fat in the diet can certainly address these problems. But there are other reasons why we may want to add fat to the diet. For instance, enhancing the coat and body condition of horses that are showing or going to sales or possibly reducing the occurrence of common debilitating conditions, such as tying up.

Most sources of concentrated fats are well tolerated and absorbed by the horse, while containing about 2 1/2 times as many calories as grains by weight. Equine nutritionists now recommend that the diet or the ration for performance horses contain 7 - 10% fat. But how much fat do we have presently in the diet and how do we get the additional fat? Whole oats contain about 5% fat, corn 4% and barley about 1% fat. Good quality pasture may contain 2% fat, while timothy and alfalfa hays will contain about 2.5% fat. Some grain concentrates have added fat from animals, soybean meal or other sources, so the fat level will vary, although it should be clearly labeled. So, most rations contain roughly 3-4 % fat and we need to make up the 6-7% deficit. 7 % of about 28,000 calories is 1960 calories in the form of fat to add.

Problem: What source of fat is best?

Unsaturated oils such as, Corn, canola, soybean etc., will contain about 9 calories per gram. One cup weighs about 1/2 pound or about 225 grams, so that's 2025 calories right there (9 x 225). Now wasn't that easy? But wait a minute, Kentucky Equine Research recently completed a study comparing rice bran, corn oil and dried animal fat with respect to two specific parameters limiting performance, heart rate and lactic acid levels. The horses on the corn oil diet had higher heart rates and levels of lactic acid at full gallops than all other categories including the placebo group. So although corn oil may aid in maintaining your horses weight, it will detract from its performance.

When we evaluate sources of fat there are a number of issues to be concerned with but we will just deal with one important one for now. It concerns the content and ratios of the different types of fatty acids in a fat source. There are basically two broad classes of fats, saturated and unsaturated. There are a number of unsaturated fats, but the most significant from a health benefit standpoint, are the polyunsaturated essential fatty acids - linoleic acid (LA), an omega 6 fatty acid and alpha-linolenic acid (ALA), an omega 3 fatty acid and they need to be in balance. For high performance athletes this balance

should probably be about 1:1. However, equine diets are currently providing about a 20:1, LA: ALA ratio.

The chemistry of the fats in soybean and canola oil is different from that of corn oil, in that the ratio of LA: ALA is about 4:1. If the ALA has been preserved in processing the canola or soybean oil, then it should not be assumed that these oils would have a similar detrimental effect on performance as corn oil. Although these oils are not expensive, this is a very big if and the inclusion of these oils in the diet still won't get our LA: ALA ratio near 1:1.

Is there an economical way to obtain fat, yet also improve performance? Absolutely! The only source of naturally occurring oil offering higher alpha-linolenic acid levels than linoleic acid is flax. Flax is not new to horses. So what's the big deal you say? Well, lets go over the basics; fully mature Canadian flax will have a fat content of at least 35 %. But by far the greatest advantage is the unique fatty acid profile of flax. 57 % of the fatty acid content consists of ALA at about a 4:1 ratio to LA. This is HUGE, because ALA has a HUGE positive impact on performance for all athletes.

The following benefits attributed to ALA, have solid scientific research behind them

- * ***Anti-inflammatory properties***
- * ***Increased Energy production***
- * ***Lowered blood pressure***
- * ***Immune system enhancing properties***
- * ***Recovery from fatigue***

This is too good to be true. Well it is true, but there are some issues of concern. First of all, the seed coat must be cracked or cut up some how to allow the digestive system access to the oil and other nutrients, otherwise the whole seed just flies right on through you or your horse.

The chemical structure of ALA, which is responsible for the aforementioned beneficial properties also accounts for the drawbacks. Both LA and ALA, but especially ALA are highly susceptible to oxidation and will rapidly turn rancid if exposed to oxygen, light or excessive heat. This is why you find fresh pressed flax oil in a dark brown bottle and in the refrigerator when you purchase it. Even so, once you open it, oxygen enters the bottle and even if you put it right back in the fridge, with the lid on, it will be rancid within 4 - 6 weeks. If you try to grind flax seeds yourself, you will get mush. If you use it right away, you are all right

but you will have to grind it on a daily basis because it will deteriorate so rapidly. Horses will eat almost anything, but they won't eat rancid flax oil.



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What Makes Our Flax Better?

Typical hammer mills, which grind and process feeds for your animals are not ideal processing plants for flax, because the seed is smashed open, the oil is exposed and oxidation begins immediately. Another common practise thought to expose the nutrients in flax seed safely and effectively, is to boil the flax. Hu hu, research shows that boiling does absolutely nothing to enhance digestibility of the flax. All that thick gummy looking stuff on top is, well, exactly that, all the natural gums from the seed coat have been nicely extracted, but that's about it and they don't have a whole lot of nutritional value, sorry.

So we know we have to crack the seed, but the milling process has to be extremely specialized in order to maintain the integrity of our precious oils. And, what about the seed itself, does the quality of seed we start with have any bearing on stability issues?

The selection of a high quality seed is a substantial issue. A fully mature seed will have higher levels of fat with an even higher ratio of ALA to other fatty acids in comparison to an immature seed. But equally important, the mature seed will have a fully developed naturally occurring level of antioxidants such as vitamin E, which helps to protect the oils to a much greater degree once the seed is cracked. Immature, low weight, feed grade seeds do not have the same level of natural protection.

Immature, feed grade seeds also have levels of cyanogenic compounds, which may be harmful (which is another reason why people may have been boiling flax), but fully mature seeds have insignificant quantities of any cyanogenic compounds.

Now we just need to find a mill that will select only the best quality, fully matured flax, a mill that will triple clean the flax of all rubbish and then with the expertise and equipment to cut up the seed without smashing all the oil out and exposing it to the elements. Such a mill exists and we are pleased to announce a strategic alliance with them to bring a first class stable milled flax product to the equine industry. This is a human, bakery grade milled flax, with a marvellous texture and aroma that you and your horses love. There are no additional fillers or preservatives, just pure Canadian stable milled flax, with a guaranteed shelf life of nine months.

Other issues involving flax and the equine diet:

How much stabilized milled flax should be fed?

Most grains and grain concentrates contain roughly 1400 calories of digestible energy (DE) per pound. Stable milled flax contains 2100 calories per pound. If we again assume that the average 1200 lb performance horse requires 28-30,000 calories per day and you need to increase calories without adding additional grain. Each cup (1/4 lb) of flax will add approximately 535 calories per day, or an increase of nearly 2% of the total caloric intake. If you are looking to replace grain in the ration, the inclusion of flax would

replace grains at a rate of 2: 3 or 1/2 pounds of flax would replace 3/4 pounds of grain. Thus, for either of the purposes above, between 1 cup, or 115g (1/4 lb) and 4 cups 460g (1 lb) per day, may be appropriate.

Stable milled flax contains at least 35 % fat. Of this, about 70% of the fat consists of the polyunsaturated essential fatty acids, alpha linolenic acid (ALA) at 57%, and linoleic acid (LA) 14%. This equates to an ALA: LA ratio of about 4:1. Since the recommended ratio is about 1:1, how much do we need to get back to a 1:1 ratio?

The average equine diet contains approximately 3-4% fat. Roughly 38% of the fat is in the form of LA, but just 2% as ALA for a ratio of about 20:1, LA: ALA. To get this ratio back near to 1:1 would require at least one pound (4 cups) of flax per day. But even if we feed just two cups per day we taking huge strides to correct the imbalance and take advantage of the health benefits of the ALA in flax.

The recommended calcium: phosphorus ratio ranges from 5:4 to 5:2. There are two key concepts to keep in mind, the level of calcium must always exceed that of phosphorus and it is important not to exceed the upper level recommendation for calcium, as this will interfere with the absorption of magnesium and some trace minerals. Flax has a naturally occurring 2.6: 1 ratio of phosphorus to calcium opposite the recommended ratio. Is this a problem?

The recommended daily levels of calcium and phosphorus in the diet of a performance horse range from, 28 - 40g of calcium and 18 - 30g of phosphorus. Even if we add $\frac{3}{4}$ of one pound of flax to this existing ration, we add less than one gram of calcium and less than 2 grams of phosphorus. Obviously, this small amount of additional calcium or phosphorus barely changes the ratio and certainly maintains it within the recommended range.

Although the daily magnesium requirement in the equine diet is just 1/3 that of calcium, or about 8 -12 g, it is often deficient by about 1-2 g, due to deficient intake or mal-absorption. 1/2 pound of flax delivers approximately one gram of magnesium.

So flax is not only a source of fat calories but an excellent source of alpha linolenic acid, fibre, protein, magnesium, other minerals, vitamins and antioxidants.