

## 7Equi-Pro Carb-Safe Complete™ Feed

Low non-structural carbohydrate feed for horses.

Poulin Grain is proud to introduce EQUI-PRO CARB-SAFE COMPLETE™, the newest addition to Equi-Pro Feeds. This advanced technology feed contains no grain or molasses, less than 11% non-structural carbohydrate (sugar and starch), high levels of the antioxidants, Selenium and Vitamin E, and is fully fortified with vitamins and chelated trace minerals. CARB-SAFE COMPLETE™ is formulated for horses that may be sensitive to sugar and starch. Some of the diseases that are sensitive to high levels of non-structural carbohydrates are Cushings, Laminitis, Chronic Obesity, Insulin Resistance, and Tying-Up.



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# Poulin Grain®

A Family Feed Company

## Equine Feed

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### Methods to Reduce Non-structural Carbohydrate Content of the Diet

*Stephen Duren, Ph.D.  
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Many horse owners would like to reduce the amount of carbohydrate in the diets for their horses. The reasons, or potential reasons, for wanting a low carbohydrate horse feed could include the desire to influence or modify behavior, or a sensitivity to so-called carbohydrate diseases including: Tying-up, Cushing's, Laminitis, Obesity or Insulin Resistance. In a previous newsletter (July – 2003) we discussed the various types of carbohydrates in horse diets. These carbohydrates can roughly be divided into two types: Structural and Non-structural. Structural carbohydrates are often referred to as fiber. Hay, mature pasture grass, beet pulp and soybean seed coats are good sources of fibrous carbohydrates. Structural carbohydrate (fiber) shouldn't be the target for dietary elimination since fiber is essential for proper function and motility of the horse's digestive system. The other broad classification of carbohydrates is non-structural carbohydrate. Non-structural carbohydrate consists of sugar, or carbohydrates such as starch, that can be broken down to simple sugars within the horses' digestive system. Feed



ingredients rich in sugar and starch include oats, corn, barley and molasses. Our effort to control carbohydrate content of a horse's diet should be aimed at reducing the amount of non-structural carbohydrate (sugar and starch). The following are methods to help horse owners reduce non-structural carbohydrate content of the diet.

#### **Sugar in Hay and Pasture?**

Before going too far in trying to reduce the non-structural carbohydrate content of your horse's diet, a bit of reality is in order. Hay and/or pasture, the one ingredient that all horses require, contains fibrous carbohydrate which is essential for normal gut function, but hay and pasture also contain sugar and starch. Therefore, complete elimi-

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### Poulin Grain has new forage lab

#### *Green Mountain Forage Lab*

Poulin Grain has begun operation of Green Mountain Feed Lab August 2005. Poulin Grain plans to increase the level of service and sophistication of nutritional recommendations to equine enthusiasts throughout New York and New England. Green Mountain Feed Labs operates the most advanced system and calibrations providing our nutritionist with precise hay results for all critical nutrients such as; protein, fat, digestible energy, fiber digestibility, minerals and carbohydrates including starch and sugar. Poulin Grains commitment to health and performance continues. For more information on how Green Mountain Feed Lab can help you with your horse's nutrition, please call Poulin Grain at 1-800-334-6731.

nation of sugar and starch from the horses' diet is not possible. In a process called photosynthesis that occurs during daylight hours, carbon dioxide, water and energy from the sun are utilized by the plant to form sugar. Sugar is then utilized by plants at night, in a process called respiration, to form more complex fibrous carbohydrates. When photosynthesis outpaces respiration, such as during cool nights in the spring and fall, plants accumulate sugar. Plants also accumulate sugar if they are stressed by drought, or by nutrient deficiencies. The sugar content of forage contributes to the total non-structural carbohydrate content of the diet and when horses are sensitive these sugars need to be minimized. To minimize sugar content of hay it should be cut in the early morning hours, prior to photosynthesis beginning at first light. If horses are to have access to pasture, they should graze early in the morning when the sugar content of the grass is the lowest. If you have already purchased hay, the sugar content can be reduced by soaking the hay in water prior to feeding it to the horse. Katy Watts, Rocky Mountain Research, determined that soaking hay in cold water prior to feeding for 30 or 60 minutes will signifi-



cantly decrease (18 – 30%) the sugar content of forage. Watts also pointed out that simply selecting the type of hay fed will not always guarantee a low sugar content since sugar content is influenced by environment and plant health.

**Sugar in Grain**

Since most grain concentrates contain a combination of corn, barley, oats, wheat or molasses, it should come as no surprise that non-structural carbohydrate content is high. To minimize non-structural carbohydrate intake, the amount of grain being fed must be reduced. Unfortunately, most grain concentrates also contain the vitamin/mineral portion of the diet and a reduction in feeding amount also decreases the amount of vitamin/mineral fortification. Certain grain concentrates may contain

less non-structural carbohydrate than others if their inclusion of fat and fiber (beet pulp, soybean hulls, alfalfa) are higher and the grain and molasses content is reduced. An example of a grain concentrate with a lower non-structural carbohydrate content would be EQUI-PRO PERFORMANCE™ 10:8 or 10:12 with a non-structural carbohydrate content of 33% compared to 77% for corn. Grain concentrates, despite what manufacturers advertise, will never be considered a low non-structural carbohydrate product for horses that are sensitive to sugar and starch in their diets.

**Low Carbohydrate Alternative**

Poulin Grain, working in conjunction with Performance Horse Nutrition, has created a low non-structural carbohydrate feeding option for horse owners. EQUI-PRO CARB-SAFE COMPLETE™ is a new feed designed for mature horses that are, or may be, sensitive to non-structural carbohydrate (sugar + starch) content of their diet. CARB-SAFE COMPLETE™ contains no grain or molasses and is fully fortified with vitamins, organic trace minerals and a proprietary live cell yeast culture. CARB-SAFE COMPLETE™ contains less than 11% non-structural carbohydrate and it is truly a low non-structural carbohydrate option for horses. The following table lists the non-structural carbohydrate content of several of the grain products offered by Poulin Grain.

Table 1. Non-structural carbohydrate content of feeds\*\*

Product	Non-structural carbohydrate (NSC), %
"Low NSC"	
Alfalfa Hay	11.4
Grass Hay	13.3
Beet Pulp	12.2
Poulin Equi-Pro CARB-SAFE™	11.0
Poulin Stable Mate 14% Complete™	16.3
Poulin Equi-Pro MVP Supplement™	17.4
Equi-Pro Premium Senior™	31.3
Poulin Equi-Pro Performance 10:12™	33.7
Poulin Equi-Pro Performance 10:8™	33.9
"Moderate NSC"	
Poulin Equi-Pro Growth™	40.4
Poulin Equi-Pro Development™	40.7
Poulin Equi-Pro PerforMAX™	41.1
"High NSC"	
Oats	50.7
Barley	63.1
Corn	77.0
Molasses	58.4

\*\*Dairy One Forage Laboratory, Ithaca, New York.

**Research Update**

**Gastric Ulcers in Horses**

Dr. Stephen Duren  
Performance Horse Nutrition

Gastric Ulcers are a significant problem in many types of performance horses. It had been reported that 93% of racehorses have gastric ulcers, while nearly 60% of non-racing performance horses have ulcers. The cause of gastric ulcers is stomach acid eroding the lining on the stomach. Why do performance horses get gastric ulcers? One of the main theories revolves around diet. When a horse begins its racing or performance career the horse gradually consumes less and less hay while the intake of grain increases. When a horse chews an equal weight of hay versus grain, twice as much saliva will be produced when the horse consumes hay. One of the main buffers for stomach acid is saliva. Therefore as performance horses consume more grain and less hay, the potential for ulcer development increases. This theory gets stronger when you consider that horses with free-access to good quality pasture rarely get ulcers. A recent study looked at the incidence of gastric ulcers in 80 horses housed at the University of Connecticut. These horses were between 2 and 23 years of age and represented Morgan, Thoroughbred, Quarter Horse, and grade animals. An 11% incidence of gastric ulcers was reported in this group of non-show horses. The incidence of ulcers was highest for horses 8 to 17 years of age. Finally, this study reported that mares were more likely to get ulcers compared with geldings and breed did not seem to influence the incidence of ulcers.

Reference: K:Chameroy et al., 2005  
Effect of age, gender, breed and use on occurrence of gastric ulcers in horses. 19th Equine Science Society Symposium, p. 215

**Do you have a question on Equine Nutrition?**

Ask your question here and mail it to:

Poulin Grain, Inc.  
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**Question & Answer with Dr. Stephen Duren**

**Can feeding grain to horses make them high or crazy?**

A great deal of controversy exists regarding feeding and behavior. Terms including high, crazy, and hot have been used to describe the reaction many horses seem to have when they are fed grain. Two schools of thought exist about whether grain affects behavior. The more traditional thought, held by many scientists, is that the only important factor governing feeding and behavior is calorie intake. If a horse is underfed and in negative energy balance (losing weight), then it will not be as active or aggressive as when it is well nourished. Advocates of this point of view insist that behavioral changes associated with horses on full feed are simply an expression of the true personality of the horse. Supporters of this theory suggest that the horse does not have behavioral problems associated with feed, but instead behavioral problems associated with a lack of proper training. A second school of thought acknowledges what so many horsemen believe is indeed real. Certain types of feed may affect the behavior of certain horses. To date, there is no concrete evidence to support this theory. However, a potential mechanism exists that may explain behavioral changes associated with feed. When horses consume grain, blood glucose (sugar) levels increase. The extent of increase depends on the type and amount of grain, and some horses have much higher blood glucose peaks than others. In humans, it has been theorized that many mental disorders such as schizophrenia, mania, and depression are the result of uncontrollable fluctuations of brain glucose acting in conjunction with insulin resistance. These fluctuations influence the production of the neurotransmitter serotonin. Mania in humans has been associated with elevated blood sugar and high levels of serotonin. Because horses normally do not eat grain-rich diets, they may experience drastic changes in blood sugar when fed concentrates. Of course, this is all theory and has not been documented in horses. The probable answer to the question is that grain does have the potential to influence behavior in horses. To minimize any potential behavioral changes, the following feeding strategies should be utilized with horses. Keep meal size small as it is better to feed two small grain meals instead of one large meal. Feed plenty of forage. The fiber in forage will minimize rapid intake of grain and help prevent spikes in blood sugar. Add fat to the diet. Digestion of fat produces energy but does not produce changes in blood sugar.