Starch Digestibility

Importance of Starch

Dairy herds depend on forages not only for fiber, but also for other nutrients such as protein, starch and energy contribution, which is becoming more important due to high concentrate prices and low milk prices. Starch is the major energy component of grain and represents over 70% of DM of most cereal grains. Likewise, starch comprises about 28-32% of the total DM ration for cows. Starch digestibility, both in the rumen and intestine, has a crucial impact on milk production. We need to provide the best mixture of starch sources to high-producing dairy cows to ensure high rumen efficiency and maximum energy utilization. Cereal grains, such as corn and barley, provide the greatest proportion of the starch in a cow’s diet. However, most of the starch supplied in dairy cow’s diet comes primarily from high-moisture corn, dry grain corn, and corn silage.

Factors affecting Starch Digestibility (SCHd)

The digestibility of cereal grains can be highly variable. Various factors such as, starch type, particle size (fine vs. coarse grind), grain processing (steam flaked vs. dry rolled), storage method (dry vs. high-moisture corn), moisture content of high-moisture corn, type of corn endosperm, and corn silage maturity at harvest, chop length, and kernel processing, influence starch digestibility in lactating dairy cows (Firkins et al. 2001).

It is known that starch availability of corn and sorghum is, on average higher than that of wheat.

Fast >--------------------- Intermediate ---------------------------> Slow
Wheat -----Barley --------Oats--------Corn ---------------Sorghum

For corn and sorghum grains, particle size reduction, either by the animal or by mechanical processing of the grain prior to feeding, generally increases starch digestibility. Because of the non-crystalline nature of the starch in high-moisture corn (HMC) (28-32% moisture), it is usually recommended that it be rolled rather than ground. Grinding usually makes HMC degrade too rapidly and cause acidosis. However, when HMC moisture is higher than 32%, fine ground is recommended.

With mature corn silage, some whole corn kernels will be found in feces unless feedstuffs have been adequately “kernel processed” during harvest to damage the kernels or the corn particles are adequately softened during fermentation to increase starch digestibility. The crude protein, prolamin protein or vitreousness of dry grain corn is negatively related to starch degradability in dairy cows.
Why Test for Starch Digestibility?

The main objectives of dairy producers to secure increased milk production are maximize energy efficiency, increase microbial protein and reduce rumen acidosis, with starch being starch the major component in the diet involved in these 3 objectives. Due to high grain prices and considering that starch comprises 28-32% of the TMR for a dairy cow, starch from dairy cow’s diet should provide maximum overall digestibility while, at the same time, providing an ideal balance of rapidly and slowly degradable starch to optimize rumen efficiency and maximize production.

Some of the reasons why dairy cow diets must be tested for starch digestibility are:

a. SCHd can provide intuitive responses to ration adjustments by the nutritionist.
b. SCHd is used in nutrition programs to generate rates of digestion.
c. SCHd allows formulating an optimum fermentable starch level based on stage of cow’s production while preventing acidosis.
d. Starch digestibility may provide a tool for screening grains with respect to fermentability and assist in the selection and breeding of feed grains.
e. SCHd analysis can give valuable insight as to how ration starches will be digested and utilized by the cow.


In vitro Starch Digestibility Packages

The time points available are 3 and/or 7 hours. This must be run with a package or starch as an option.

1 Time Point ...............................$ 45.00
2 Time Points ...............................$ 75.00

- Samples requesting in vitro digestibility need to be at the lab by Monday 4pm to be analyzed for that week.
- Each sample is run in duplicate using fluid from 2 lactating cows.