

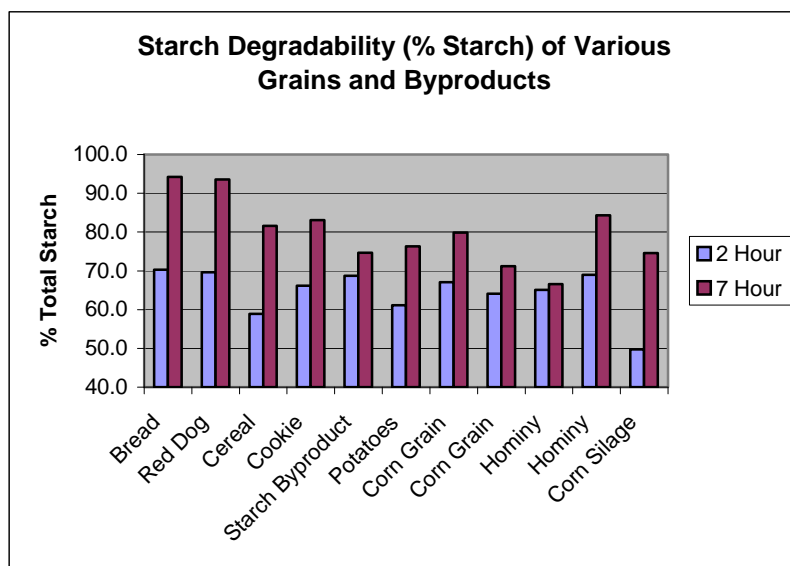
# Do You Have Control of the Starch in Your Rations?

Ralph Ward, Cumberland Valley Analytical Services, Inc.

Mary Beth de Ondarza, Ph.D., Paradox Nutrition, LLC

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With today's high feed prices, it is more essential than ever to get full utilization of the starch in rations. Undigested grain in the manure is unacceptable. At the same time, we need to optimize rumen efficiency. A high extent of starch availability is desired but a combination of rapidly and slowly available starches will help with acidosis control. We need to prevent hours of high rumen acidity during the day caused by too much rapidly available starch in the diet. For optimum rumen function and highest microbial protein yield, we also want to synchronize hourly availability of starch, protein, and nitrogen in the rumen. Laboratory analyses are available which can give us valuable insight as to how ration starches will be digested and used in the cow. Chemical properties such as endosperm type and maturity, dry matter content, and particle size are all known to effect starch digestibility (Shaver, 2007).



## In Vitro Starch Digestibility

In vitro starch digestibility helps us to understand differences in chemical properties of starches that affect their availability in the rumen. CVAS measures starch degraded by rumen microbes after a 7-hour incubation. Feed samples are ground through a 2 mm screen and are incubated in rumen fluid from early to mid lactation cows fed a high-group TMR. Rumen fluid is collected daily generally from three cows and co-mingled. After incubation, residual starch is evaluated by traditional enzymatic methods. A 2-hour incubation is also available that provides information concerning how quickly a feed starch may break down in the rumen.

## Grain Particle Size Evaluation

The CVAS Grain Particle Size analysis reports the mean particle size (MPS) in microns and surface area. This procedure separates a grain sample through a series of 12 sieves using the Kansas State procedure (Herrman, 2002). It has been recommended that corn grain be ground to 1100 microns (Hutjens, 2008). The rumen starch degradability of a corn grain sample will be related in part to the mean particle size and surface area.

## Corn Silage Processing Score

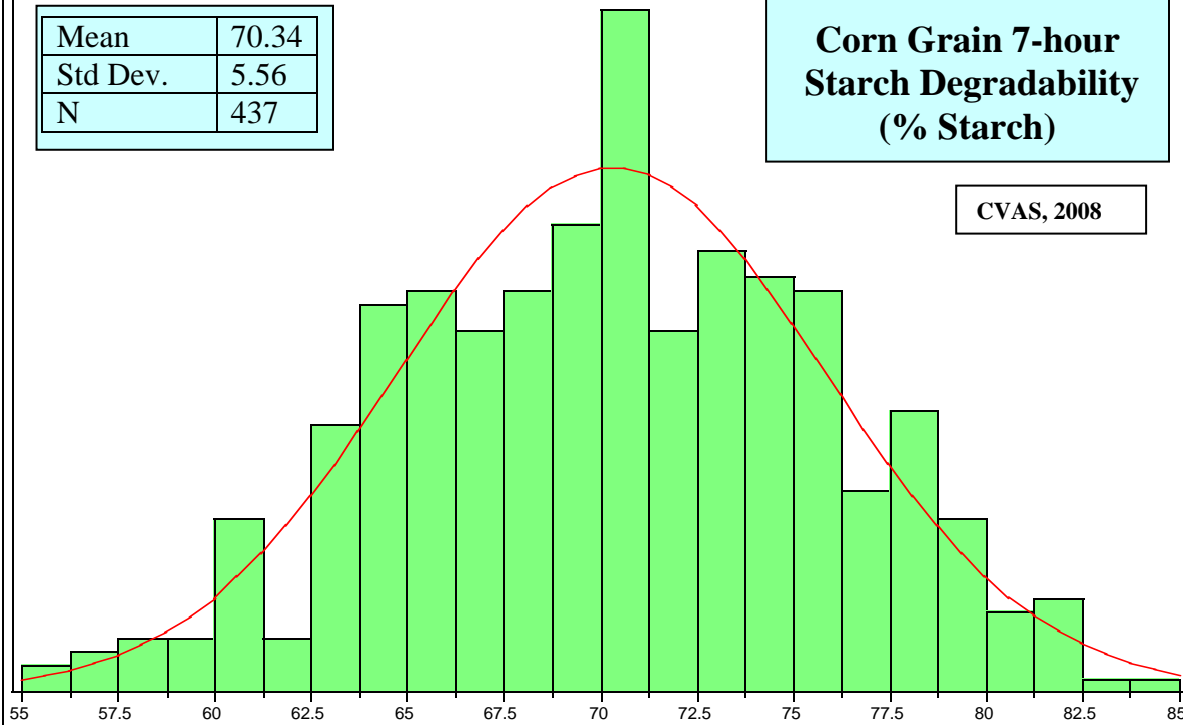
CSPS is the percentage of corn silage starch that passes through a 4.75 mm screen. Experts have suggested that >70% CSPS is optimal, 50-70% is average, and <50% is inadequate (or too coarse). However, with >70% CSPS, sub-clinical acidosis may be a greater concern so ration adjustments such as lowering starch and increasing effective fiber levels may be necessary (Grant, 2008).

CVAS is conducting more research to better describe starch digestibility. At this time, our best advice is to use a combination of in vitro digestibility, particle size, and dry matter analysis to better understand starch source characteristics. We look forward to providing a method to integrate these measurements for better estimating starch digestibility in the future.

Mean	70.34
Std Dev.	5.56
N	437

**Corn Grain 7-hour  
Starch Degradability  
(% Starch)**

CVAS, 2008



Mean	62.01
Std Dev.	9.73
N	5290

**Corn Silage 7-hour  
Starch Degradability  
(% Starch)**

CVAS, 2006 & 2007 Seasons

