Steam-Flaking May Reduce Nitrogen Secretion

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Starch degradability in the rumen varies with grain source and processing methods. Extensive processing of grain increases the rate of starch digestion in the rumen because of increased exposure of the kernel to microorganisms.

Research has shown that steam flaking of corn increased starch digestibility in the rumen from 35 to 52 percent compared to dry rolling. Total tract digestibility of starch was also increased from 73 to 97 percent. Consequently, net energy for lactation of corn was increased by 20 percent. When steam-flaked corn was fed, milk production and protein yield were increased by 5 to 8 percent, respectively, compared to dry rolled or steam-rolled corn. These increases were not associated with any significant changes in milk fat yield.

Steam flaking of grains has been shown to increase microbial protein production in the rumen. This could translate into lower protein requirements from the diet and less nitrogen excretion. Recent studies at Virginia Tech showed that nitrogen excretion in the feces was reduced when a steam-flaked corn diet was fed compared to a dry ground corn diet.

Decreased nitrogen excretion or increased efficiency of nitrogen utilization may have a positive effect on reproductive performance. Increased degradation of starch in the rumen reduces ammonia absorption due to greater utilization for microbial protein synthesis. Feeding steam-flaked corn increased recycling of blood urea nitrogen to the gut by 80 percent compared to dry rolling or steam rolling in low protein diets.

This transfer of urea to the gut conserves nitrogen and increases microbial protein production. This also may reduce the concentration of urea nitrogen in blood, and improve reproductive performance.

Research has shown that embryonic survival may be compromised in cows that have a high blood urea nitrogen concentration. A recent study at Penn State showed that feeding steam-flaked corn resulted in low milk urea nitrogen concentrations. In that study, steamed flaked corn was included in the diet at up to 28 percent, and the diet contained 18 percent crude protein. Mean milk urea nitrogen concentration was lower than the average reported for many dairy farms.