

Effect of Endosperm Type on Starch Availability of Corn: Implications on diet digestibility and performance of finishing feedlot cattle

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Corn is the world's most widely utilized feed concentrate, and in the U.S., comprises roughly 80% of the feed grain consumed by livestock (USDA, 1992). Many corn hybrids are commercially available; however, they differ largely in their chemical composition and structure. For instance, while corn hybrids differ only slightly in their concentrations of starch (67.7 to 73.7%; Mahanna, 1997, unpublished data as cited by Dado, 1999), they differ markedly in their degree of starch vitreousness (approximately 30 to 72%; Majee and Shaver, 2001, unpublished data). The endosperm within a corn kernel is partitioned into either a floury or a vitreous type. Floury endosperm is characterized by large starch granules loosely associated with a protein matrix (Kotarski et al., 1992; Dado, 1999). In contrast, vitreous (corneous or hard) endosperm implies a tightly compacted endosperm where starch granules are embedded in a thick protein matrix (Watson, 1987). Corn hybrids containing high proportional concentrations of vitreous starch tend to be more resistant to disease and tend to have higher test weights compared with floury hybrids, and it is worthy to note that these two attributes have been important selection criteria among seed corn producers. Unfortunately, these vitreous endosperm hybrids also tend to have lower starch digestibility as suggested by Philippeau and Michalet-Doreau (1997). Moreover, Philippeau and Michalet-Doreau (1998) reported that greater ruminal starch digestibility of dent versus flint corn was associated with lower endosperm vitreousness. In a later study (1999) using compiled data, Philippeau and Michalet-Doreau reported that 88.5% of the variation in ruminal starch degradability was associated with vitreousness. This seminar will expand on the effect of starch endosperm type on diet digestibility and beef cattle performance. Furthermore, I will attempt to clarify the interaction between corn hybrid and processing method. This seminar will conclude with implications for the cattle feeder, and considerations for further research.

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