Digestible Energy of Various Corn Plant Parts

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Various corn plant parts are used as dairy forage. Typically, corn is cut ~6" above the soil surface and then the entire plant is chopped into smaller pieces. Roughly half of the corn forage dry matter (DM) is corn grain, while the other half is stover (stalk, leaves, ear shank, cob). A corn kernel processor properly set so kernels are broken or cracked makes the corn grain portion of silage nearly 98-100% digestible. Plant parts in the stover portion vary in fiber digestibility and contribution to yield. There has been recent interest in harvesting and ensiling various plant parts for later feeding. For example, snaplage includes grain, cobs, husks, leaves, and shanks. Likewise, the cutter bar is often raised so more of the bottom portion of the plant is left in the field while the upper portion is cut, chopped, and ensiled.

A common question is, what is the yield and quality of plant parts? Grain-fill affects nutrient partitioning from stover to ear. Significant remobilization of carbohydrates occurs from stalks, leaves, and husks to grain during the last half of the grain filling period. The plant's leaf and stem carbohydrate characteristics are affected at different times during grain filling. Total stem weight decreases with grain filling and the upper portion of the stems, leaves, and husks significantly decreases in weight between soft and hard dough stages while the lower portion only decreased during early ear development.

Hansey et al. (2010) found the leaf portion only comprises about a quarter of the stover fraction, while the stalk comprises about half (Table 1). A large portion of sugars and nutrients reside in the stalk. Thus, the ability to manage the stalk portion is very important. Stalks are the least digestible plant part, while the leaves (blade, midrib, sheath) are the most digestible and desirable stover plant segment as measured by NDFD.

Table 1. Percent of the total stover DM weight and fiber digestibility of different plant parts at R6.

Plant Part	DM Weight (%)	ADF (%)	NDF (%)	NDFD[a] (%)
Stalks	46	47	71	38
Cobs	13	45	78	44
Leaf Blades	12	35	72	58
Leaf Sheaths	12	39	72	52
Husk-Shanks	10	41	76	*NR*
Midribs	6	45	70	*NR*
Tassels	1	*NR*	*NR*	*NR*

Values are averages of 23 hybrids evaluated at two locations (Madison and Arlington, WI, USA) and two replications in each location in 2006.
NR not recorded; [a]NDFD=100([NDF−(100−IVTD)]/NDF)

Literature Cited: Hansey, C., A. Lorenz, and N. de Leon. 2010. Cell Wall Composition and Ruminant Digestibility of Various Maize Tissues Across Development. BioEnergy Research 3:28-37.