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Comparative value of silages based on digestibility

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Price discovery for sorghum silages generally uses corn silage as a base value. Discounts are then applied using general assumptions of relative energy concentrations. However, there are variations in the energy value of silages. Recent data provided by a commercial laboratory in Kansas shows that, for the region including Texas, TDN values for corn silages averaged 70.9% but ranged 9-10% points either side of this average. The broad classification of sorghum silage averaged 63.7% and ranged 15% points either side of this average. Hence, there were sorghum silages with equal or greater value than average corn silage, and there were corn silages with values equal to or lower than average sorghum silage. Broadly classifying silages and pricing according to general assumptions of relative energy value does not adequately compensate or discount the actual silage being marketed. An alternative method of pricing would be based on the digestibility or energy value of the silage delivered. A base price would be set for a given digestibility or energy value then all silages could be evaluated and priced accordingly.

The following is an example of such a process and demonstrates value differences among silages. The data used is from the 2002 Texas Panhandle Forage Sorghum Silage Trial conducted at the Texas A&M Bush Farm near Bushland, Texas. A full report of this information and cropping practices can be obtained from the annual summary (see below). Silages were sampled at harvest (soft dough stage). In vitro true digestibility (IVTD %), an indicator of the amount of forage material that can be digested and hence an indicator of energy availability, was analyzed by the Dairy One Lab in Ithaca, NY. Corn silage was used as the base for comparison. A price (\$/ton) was assigned corn silage and this price was adjusted for other silages based on their IVTD values. Table 1 illustrates the calculations.

The average IVTD values for the different types of silages as well as the range of values within each type are presented in table 2. Some types and varieties within types had IVTD similar to corn silage while others were lower and would be discounted. So, broadly classifying all sorghum silage varieties as sorghum silage does not compensate for the quality of specific varieties.

The adjusted ton values (average values and the range in values; \$/ton) at a common moisture content are presented in table 3. The base value of \$24.00/ton was set for corn silage with an average IVTD of 81.3%. Based on IVTD, there was a \$3.25/ton range in value for the four corn silages produced in 2002. The brown midrib forage sorghums had an average value near to corn silage with a \$3.24/ton range in values. The non-brown midrib forage sorghums were less digestible on average, had a lower average value and a \$4.48/ton range in values. The photoperiod sensitive varieties were less digestible and therefore had lower relative values per ton of silage.

Although this data represents a single year of evaluations, it serves to demonstrate that nutritional and economic value differences exist among types of silage and varieties within types. Therefore broadly classifying silages and pricing accordingly does not adequately compensate higher quality varieties or discount lower quality varieties. Price should be established on the nutrient value of the silage.

Sorghum silages require less water than corn silage. Hence these silages are an alternative for silage growers with limited water. By comparing varieties, silage users and growers can select for a silage crop approaching the value of corn silage. Pricing silage based on nutrient value will reward these efforts and aid in extending the life of groundwater resources.

To view a full report of data from the 2002 variety trial, please see:

Brent Bean, Ted McCollum, Dennis Pietsch, Matt Rowland, Bruce Porter, Rex VanMeter. 2003. 2002 Texas Panhandle Forage Sorghum Silage Trial. Texas Cooperative Extension and Texas Agricultural Experiment Station, Texas A&M University Agricultural and Extension Center, Amarillo, Texas.

<http://amarillo.tamu.edu/amaweb/Programs/Agronomy/publications/bean12.pdf>

Table 1. Adjusting silage value (\$/ton) based on in vitro true digestibility (IVTD)

$$(1) \text{ Establish Base Value for silage: } \quad \$/\text{ton @ set moisture and IVTD}$$

$$(2) \text{ Adjusted value of alternate silage @ set moisture:}$$

$$= \frac{\% \text{ IVTD alternate silage}}{\% \text{ IVTD Base}} \times \$/\text{ton Base}$$

Example:

Base value: Corn silage \$24.00/ton @ 68% moisture and 81.3% IVTD

Alternate silage source: 75% IVTD

Adjusted value of alternate silage:

$$= \frac{75\% \text{ IVTD}}{81.3\% \text{ IVTD}} \times \$24.00/\text{ton Base}$$

$$= \$22.14/\text{ton @ 68\% moisture}$$

Table 2. In vitro true digestibility (IVTD) of different silages, 2002 Texas A&M University Bush Farm, Bushland Texas

Silage type	IVTD, % ¹	Range ²
Corn	81.3	(76 - 87)
Forage Sorghum Brown Midrib	80.2	(74 - 85)
Forage Sorghum Non-Brown Midrib	77.6	(66 - 81)
Forage Sorghum Non-Brown Midrib Photoperiod Sensitive	65.6	(63 - 69)
Sorghum/Sudan Brown Midrib	73.7	(73 - 75)
Sorghum/Sudan Non-Brown Midrib	71.5	(64 - 76)
Sorghum/Sudan Brown Midrib Photoperiod Sensitive	69.0	(67 - 72)
Sorghum/Sudan Non-Brown Midrib Photoperiod Sensitive	66.4	(64 - 68)
Grain sorghum	84.0	(82 - 85)

¹ Means for varieties within each type

² Range of IVTD among varieties within in each type

Table 3. Value of silages (\$/ton) based on IVTD. Corn silage @ \$24.00/ton and 81.3% IVTD used as base.

Silage type	Value, \$/ton ¹	Range ²
Corn	24.00	(22.43 – 25.68)
Forage Sorghum Brown Midrib	23.67	(21.85 – 25.09)
Forage Sorghum Non-Brown Midrib	22.91	(19.43 – 23.91)
Forage Sorghum Non-Brown Midrib Photoperiod Sensitive	19.36	(18.59 – 20.36)
Sorghum/Sudan Brown Midrib	21.75	(20.95 – 22.14)
Sorghum/Sudan Non-Brown Midrib	21.11	(18.89 – 22.44)
Sorghum/Sudan Brown Midrib Photoperiod Sensitive	20.37	(19.78 – 21.25)
Sorghum/Sudan Non-Brown Midrib Photoperiod Sensitive	19.60	(18.89 – 20.07)
Grain sorghum	24.79	(24.20 – 25.09)

¹ Means for varieties within each type; moisture adjusted.

² Range of value among varieties within in each type

