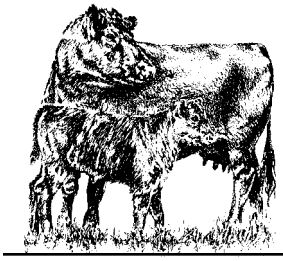

Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Nutrition Section 375

Utilizing Crop Residue as a Feed Source

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Higher hay and grain prices often force cow-calf producers to search for lower cost feed alternatives in order to stretch existing hay and forage supplies. Grazing crop residues such as grain fields that have been irrigated after harvest or cornstalk residue is a frequent occurrence. Likewise, feeding baled cornstalks is becoming more commonplace. Utilizing crop residues can reduce feed costs; however, several factors should be considered.

Feed Value

Perhaps the greatest challenge in utilizing any crop residue as a feed source is the wide variation in nutrient content and digestibility. Sprouted grains are high in nutrient value although straw residue and plant density (number of sprouted plants per acre) can impact intake. On grazed corn residue, nutrient content declines with each day that cattle are in the field. Cattle will first seek out and consume any missed ears, spilled kernels, leaves, and cornhusks. They will then consume the more lignified stalks, which are of much lower nutrient value.

The nutrient value of baled cornstalks can vary greatly depending on field conditions and harvest methods. Some growers simply bale the windrow left from the combine. Others will swath all remaining cornstalks and then rake them into a larger windrow. Swathing and raking corn stalk residue will increase the tons per acre harvested but will also increase the amount of lignified stalks and dirt content of the bales. Table 1 shows the variation that existed in several different loads shipped to northeast Oregon in 2007.

Table 1. Baled corn residue analysis results.

	% DM	% CP*	% TDN*	NO_3-N (ppm)
1	85.8	3.7	53.4	N/A
2	82.1	4.5	52.5	1,270
3	84.6	5.1	54.3	1,560
4	77.8	5.2	49.8	750
5	84.8	3.9	55.2	705
Average	83.02	4.48	53.04	1,071

*Reported on a dry matter basis.

Feed Comparisons

In order to place an appropriate value on crop residues, producers can make comparisons with more common forages or feedstuffs such as alfalfa or meadow hay. Crude protein and energy (TDN) should be the first comparisons made. It is easiest to compare on a cost per pound of nutrient basis. To make this comparison, multiply the quantity of the feedstuff by the percent of the nutrient in the feed. This will indicate the number of pounds of the actual nutrient in the feed.

Next, divide the price of the feedstuff by the number of pounds of the nutrient in the feed to get the price per pound of the nutrient. For example, alfalfa hay that is 17 percent crude protein and $180/ton would cost about 53 cents per pound (¢/lb) of crude protein:

$$\frac{\$180}{2{,}000 \text{ lb} \times 17\%} = 529¢/\text{lb}$$

Next, the percentage content of each nutrient should be considered. How do those figures compare to each other and to the cow's actual nutrient needs? Table 2 shows those comparisons.

Moisture should also be considered and adjusted to accurately compare different feed sources. When the samples in Table 1 are adjusted for moisture to match alfalfa hay (89% DM), the price for $55/ton baled corn residue becomes $58.30/ton; $85/ton baled corn residue is now $91.10/ton.

Table 2. Nutrient comparisons and needs.

	CP	TDN	NE_m	Ca	P
	(%)	(%)	(Mcal/lb)	(%)	(%)
Corn residue	4.5	53.0	.49	.39	.17
Meadow hay	13.4	60	1.31	.26	.15
Alfalfa hay	17	60	.60	1.39	.24
	(%)	(%)	(Mcal)	(%)	(%)
Requirements (1,000 lb cow)	7.32	51.3	7.57	.21	.17
Requirements (1,200 lb cow)	7.31	51.4	8.68	.22	.17

In order for a 1,200-pound cow to meet her needs for net energy, she must consume 21.3 pounds of corn residue daily on an as fed basis. To meet her needs for protein, she would have to consume over 31 pounds of corn residue.

Rate of passage of baled corn residue will be much slower than with higher quality feeds. This will reduce intake and make it impossible to meet a cow's nutrient requirements solely with baled corn residue. Intake and cow performance can be increased by supplementing protein, preferably from a natural source, such as alfalfa, canola meal, sunflower meal, etc.

Other considerations should include feeding methods and dirt content. Unlimited access to scattered round bales of corn residues or hay can result in up to a 40 percent loss due to waste. It has also been reported that some corn residue bales can contain up to 8 percent dirt by weight. Farmers swathing and baling corn stalks attempt to pick up as much stubble as possible, which may result in increased dirt contamination. It is important to consider these and other additional factors when determining the true value of baled crop residue.

Grazing

Perhaps the most cost effective method of utilizing crop residue is by grazing. This eliminates the fuel and machinery cost associated with harvesting the residue. One common problem with grazing crop residues is a lack of fences around fields. This can be easily remedied by utilizing portable electric fencing. Portable electric fencing can also be used to strip-graze the field, which greatly increases utilization rate.

Research shows that a 3-day strip-graze yields 40 percent more grazing days per acre as compared to a 14-day strip-graze (Boyles et al. 1998). Water is also a consideration. In many instances, producers will have to haul water to the fields to meet the needs of the animals.

Animal Class

Dry, pregnant (mid-gestation), mature cows are best suited to utilize crop residues. Their nutritional requirements are low as compared to lactating and late gestation animals. Growing calves, feeder cattle, and replacement heifers will generally require supplementation of protein and/or energy to maintain desirable growth rates.

Other Considerations

When feeding crop residue it is important to consider any possible negative effects of the feed. For example, certain types of grass seed straw can have high levels of alkaloids that can potentially cause negative effects on the cows, such as fescue toxicosis. All cereal grain hays should be tested for nitrates, and corn stalks are no different.

Table 1 shows the nitrate-nitrogen (NO_3-N) levels of the tested corn residue hay sampled in NE Oregon. While not alarmingly high, samples 2 and 3 should not be fed at a rate greater than 50 percent to pregnant cattle, as nitrate toxicity may occur and cows may abort fetuses or die. (Refer to 355 for additional information on nitrates). One other consideration is moisture content and the potential for mold developing in the bale. Bales that are less than 85 percent dry matter can develop mold if stored for long periods.

Summary

Crop residue can be effectively utilized to reduce feed costs. It is important, however, to consider more than just price. Producers should consider the class of animals to be fed, harvesting method, and nutrient and moisture content of any baled residue and should be willing to test for quality as well as nitrate content.

Literature Cited

Boyles, S., E. Vollborn, C. Penrose, H. Bartholomew, and R. Hendershot. 1998. Maximizing Fall and Winter Grazing of Beef Cows and Stocker Cattle. The Ohio State Univ. Ext. Ser. Bull. 872-98.

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