Feeding Residues & Byproducts in Winter Beef Cattle Diets

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Persistently dry spring and summer weather resulted in a severe shortage of roughage for wintering beef cattle and other ruminant livestock. Most grass and legume hay inventories are extremely short, leaving prices three to five times the five-year average. Highly intensified livestock production systems, such as feedyards and dairies, are able to mitigate some of the increased costs through economies of scale and alternative roughage replacements. Beef cow-calf operators, however, function more extensively than intensively, leaving less margin to offset increased costs. This has created a situation where many operators cannot afford to purchase traditional grass or legume hay for overwintering. Many will need to explore alternative roughage markets for low-quality crop residues.

Feeding crop residues to beef cattle is nothing new. However, using crop residue as the sole source of dietary roughage over the entire winter is not something many beef producers are used to, yet this is the position in which they may find themselves. They will need to consider quality characteristics and feeding values of available crop residues to optimize the use of available roughage over the winter.

Quality characteristics of crop residues. Crop residues are typically low-quality roughages, high in fiber and low in crude protein (CP). However, it may not be as obvious that in a ruminant system, these roughage sources can be useful. Although the fiber content tends to be high, there is a significant amount of carbohydrate energy stored in the fiber. But, with low CP concentrations to feed the rumen microbes that break fiber apart and extract energy, ruminants will not be able to process fiber if additional protein is not included in the diet.

Many residues and byproducts have reasonably high total digestible nutrients (TDN) and net energy for maintenance (NEm), suggesting substantial carbohydrate energy is held within the fiber (Table 1). Yet, there is a significant discrepancy between CP concentrations. Certain materials such as soy hulls and soy stover have quite high CP concentrations while others such as oat hulls and many cereal grain straws have very low concentrations. Any crop residues or byproducts can be easily used as a primary source of roughage in beef cattle diets.

Table 1. Common crop residues and byproducts for use as a primary roughage source in beef cattle diets.

Source	% DM	% TDN	NEm (Mcal/lb)	% CP
Beet pulp	91	74	0.78	9.8
Cereal grain straw	88	50	0.44	4.4
Corn stalks (grazing)	75	51	0.45	5.9
Corn stover	75	55	0.52	5.9
CRP hay	85	45	0.36	8.0
Oat hulls	90	39	0.39	4.0
Soy hulls	91	77	0.84	12.1
Soy stover	85	40	0.27	12.0
Wheat midds	91	83	0.90	18.4

Table 2. Common CP supplements.

Source	% CP	$/ton	$/lb CP
Alfalfa hay	17.0	$170	$0.50
Dried distillers grains	30.0	$185	$0.30
Canola meal	36.0	$266	$0.36
Soybean meal	46.5	$316	$0.33
Sunflower meal	34.0	$240	$0.35
Wheat midds	17.0	$145	$0.42
Commercial urea products	20.0	$300	$0.75
Lick tubs	20.0	$900	$2.25

Feeding strategies of crop residues. Although roughage sources listed in Table 1 have adequate energy concentrations to meet a significant portion of beef cattle nutrient requirements, they may not be able to meet all of them (i.e., lactating beef cows, growing cattle). When using these roughages, it is imperative to balance rations for additional minerals, vitamins, energy, and protein based on cattles growth stage. Most likely these roughages may need some additional protein supplemented in the diet (i.e., commercial supplements, high protein crops, crop byproducts). Although different protein sources may be used for different feeding situations, the main driver is availability and price (Table 2).

Price should not be the only determinant of supplemental CP source. Cost per pound does not include costs associated with freight, storage, or delivery to the bunk. Therefore, certain products may be more economically feasible than others based on those factors. However, CP cost per pound estimates do give a frame of reference for what you are paying for.