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# Grass Straw as a Beef Feed: A Research Review

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The use of alternate feed sources for the production of meat, milk, and wool can greatly improve the producers' economic advantage, with subsequent savings to the consumer. Interest in such alternatives has increased in the current high-cost situation for conventional feeds. There are many by-product feeds available, with grass seed or cereal straws in the greatest abundance.

An understanding of the general characteristics of such feeds is necessary to use them advantageously. Straws are generally low in total digestible nutrients, digestible protein, vitamins, and minerals but are high in fiber and lignin and are extremely bulky. However, they are a cheap source of energy.

## Protein Supplement Needed

Most straws will contain from 3.5 to 5.0 percent crude protein, which is somewhat below the National Research Council's recommendations for pregnant beef cows (5.9 percent), cows nursing calves the first three months post partum (9.2 percent) or replacement heifer calves (12.2 percent). This protein deficiency can be corrected safely for pregnant cows by some form of non-protein nitrogen (NPN such as 1 percent urea or 1.2 percent biuret, ammonium phosphate, etc.). Combinations of plant or animal protein and NPN can be used to

meet the requirements of calves or lactating cows. Although we have fed as high as 1.8 percent urea to calves without any apparent toxicity, our most consistent results were obtained from 1.3 percent urea. Levels this high should not be used for older cattle unless a lengthy adjustment period is provided.

## Supply Readily Available Energy

It is important when using NPN to provide some readily available energy source; only a portion of it should come from molasses. Rations containing 7 percent molasses and 7.5 percent wheat have supported greater gains and increased digestibility of the grass straw as compared to rations with 7 percent molasses and either 5 or 10 percent wheat.

## Grinding Helps

Although grinding or pelleting usually reduces the digestibility of the straw, the resulting increase in intake will more than make up for this reduction. Furthermore, the mixing of additives to the straw is facilitated and stabilized by the grinding-pelleting process.

The following table contains ration ingredients, animal intake, and gains produced in some of our ryegrass straw feeding trials.

Pelleted rations fed and performance of heifer replacements weighing 550 lbs. initially

Ingredient, %	Trial I			Trial II		
	I	II	III	IV	V	VI
Straw, ground .....	77.0	67.1	84.2	86.2	83.7	81.2
Urea .....	-----	.9	1.8	1.3	1.3	1.3
Molasses .....	7.0	7.0	7.0	7.0	7.0	7.0
Barley, ground .....	-----	-----	7.0	-----	-----	-----
Wheat, ground .....	-----	-----	-----	5.0	7.5	10.0
Cottonseed meal .....	16	-----	-----	-----	-----	-----
Mustard meal .....	-----	10.0	-----	-----	-----	-----
Alfalfa, ground .....	-----	15.0	-----	-----	-----	-----
Tricalcium phosphate .....	-----	-----	-----	0.5	0.5	0.5
Crude protein .....	9.38	9.67	9.11	8.01	8.36	8.51
Estimated total digestible nutrients .....	48.6	47.4	44.1	43.5	44.6	45.7
Intake per day, lb. ....	12.4	14.9	14.5	14.8	15.7	15.2
Average daily gain, lb. ....	1.53	1.77	1.74	1.16	1.47	1.24

## Ensilage One Answer

In addition to using grass straw in a "complete pellet" as described, it may also be ensiled. Here it is possible to add alkali solutions to the straw to break down the lignin, making more of the cellulose available for digestion. Straw treated with a 0.5 to 1.0 percent solution of sodium hydroxide (NaOH) plus the recommended additives reconstituted to 70 percent moisture and ensiled makes a palatable feed that is easy to handle. A water-tight silo is necessary to get the proper amount of moisture in the ensilage. This can be accomplished in a pit or upright silo.

The following table is a comparison of straw silages with typical grass silage when fed to 500-pound heifer replacements. The straw silages contained 20 percent molasses, 1 percent urea, 0.5 percent limestone. The treated straw silage contained an additional 4.5 percent sodium hydroxide on a dry matter basis. The ryegrass silage contained no additives. All calves received two pounds per day of a 20 percent protein supplement of ground barley and cottonseed meal. All animals received an additional two pounds of barley during the last 38 days of the 98-day trial.

Comparison of grass and grass straw silages

	Ryegrass silage	Untreated straw silage	Treated straw silage
Average daily silage intake .....	27.1	23.2	25.9
Average daily gain .....	1.01	0.88	1.00

The results reported herein have been with heifer calf replacements. Since the quality of feed is more critical for the young growing animal, the use of such materials for wintering pregnant cows should surely be adequate.

It is imperative that the limiting deficiencies of straw be corrected if successful results are to be obtained. The use of non-protein nitrogen supplementation of straw should be accompanied by some readily available carbohydrates (preferably starch) and an adequate mineral and vitamin balance. Proper mixing and an adequate adjustment period eliminate possible toxicities. The use of straw can cut feed costs without greatly reducing performance if properly supplemented and prepared.