Use of Alternative feedstuffs in Your Beef Operation

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One of the advantages of cattle production in California is the alternative feeds that are available. They are usually cheaper than grains and hays in providing energy, protein, and bulk filler to a diet. These feeds are sold by food processing plants, commodity brokers, or growers. Challenges in feeding them include:

- Variation in their nutrient value
- Handling requirements
- Possible nutrient imbalances that can occur from feeding high levels in the diet

Concentrated Energy Sources

Average Values (%)	Dry Matter	Crude Protein	TDN	Crude Fiber	Ash
Rice Bran	91	14	76	12	14.8
Almond hulls	91	4.2	54	17	6.6
Canola meal	88	36	63	10.6	6.3
Walnut meal	93	17.1	67	27	4.9
Safflower meal	92	23.9	55	34	4.3
Pinto beans	90	25.2	83	4.5	4.8

Source *–By-Products and Unusual Feedstuffs in Livestock Rations. Western Regional Extension Publication No. 39, October 1980. 22 pages*

Rice bran historically has been popular as an energy feed due to its 13% fat content. It also contains protein, B vitamins, and very high levels of readily available phosphorus. Feeding levels should not exceed 20% of the ration, as high amount of unsaturated fats can lower the cellulose digestion and impacts fat metabolism and absorption. Animals fed too much rice bran will go off feed or scour. Rice bran can be fed with salt to limit intake on a range operation. Intake needs to be monitored to adjust the salt level to reach the desired intake. Those producers that have hammer mills have just poured it over the top of the bale before it goes in for processing. The salt levels can increase water consumption.

Almond hulls are a good source of energy, but are lower in protein (4.5%). They can be fed in troughs or a hot wire can be placed on the edge of the stack and moved it in as the cattle consume the hulls. There is some waste of the product with electric fence method, but it saves labor. The major problem with the purchase of hulls is that some processors sell loads of hulls that may also contain low nutrient contaminates of shell or twigs. It is prudent to get a purity percent and or nutrient testing before comparing price quotes on almond hulls.

As consumption of vegetable oils by humans increases, more oil seed meal is available. The effectiveness of the processing plant to extract the oil from the seed will vary the energy content of the meal. Safflower is the most common in Northern California. Dairies are now using canola meal from Canada. It comes in pellets, as that is only way they can ship it in rail cars down here. Feed brokers can be one method of locating this feed.

Bean processors will have some tested lots that are rejected for human consumption and then are sold to livestock operations. Beans work best for sheep and need to be cracked or softened to facilitate consumption by cattle.

Corn has come down in price, with some ranchers reporting $180/ton for whole rolled corn. In other droughts, corn has been used to spare limited hay supplies. The general rule of thumb is that one pound of corn will replace 2 pounds of alfalfa or 3 pounds of meadow hay. The challenge for range operations is finding a way to feed corn at the ranch. Troughs or feeders work best. One rancher bought a used large 3 foot wide conveyer belt from a Nevada mine and runs the feed wagon down it. They put a connection on one end of it to pull it around the ranch to different locations. For more information see the Oklahoma State article on feeding corn to spare hay at http://www.okstate.edu/OSU_Ag/oces/timely/feeding.htm

Sample costs of some common concentrates as of January 17th are depicted below. Delivery can range from as low as $6 a ton if close to the mill and over $30 a ton as you get further away. These costs should be taken as "ball park." Prices can vary greatly; however, this does provide a general comparison between products.

Feed	$/ton truckload
Rolled corn	$230
Cottonseed	$545
Oat grain	$350
Soybean meal	$593
Canola	$455
Rice bran	$250
Almond hulls	$155
Rolled barley	$290
Corn gluten	$340
Distillers grains	$342

Roughages

During droughts or when dry matter is limited, rice straw and corn stover (baled corn stocks) have been used as low quality forage. It is recommended that before purchasing either of these products that a laboratory analysis should be conducted for crude protein and Acid Detergent Fiber (ADF). This allows the producer to select a product of the higher nutrient value that will decrease supplement costs to meet cattle needs.

	Crude Protein	ADF	Ash
Corn Stover	5.9	46	5.8
Rice Straw	4.5	48	16.6
Wheat Straw	3.6	52	7.2
Lima Bean Straw	7.6	39	9.3
Kidney Bean Straw	9.9	43	10.4

Source - By-Products and Unusual Feedstuffs in Livestock Rations Western Regional Extension Publication, No. 39

Rice Straw

A survey of over 70 harvested rice straw stacks found that they vary greatly in protein (2- 7%) and ADF (44 to 55%). Research has not been able to completely explain the reasons for this variability of rice straw nutrient values, but some of the factors that may influence quality include days baled after harvest, nitrogen management, location or soils and the variety of rice. Figures 1 and 2 are a summary of three years of nutritional variability of 133 different stacks of rice straw from across Northern California. Each year is different in the quality of rice straw that is produced and in 2008 the CP and ADF were both much lower. ADF is a laboratory method of determining the fiber content that can assist in predicting the digestibility of a feed. The lower the ADF, the more digestible the feed is. A non lactating beef cow requires a diet containing 7% crude protein (CP). The lower the CP percent of the straw the higher costs of the additional feeds or supplements to meet the cow's nutritional requirements.

Figure 1. Rice Straw Crude Protein Variability

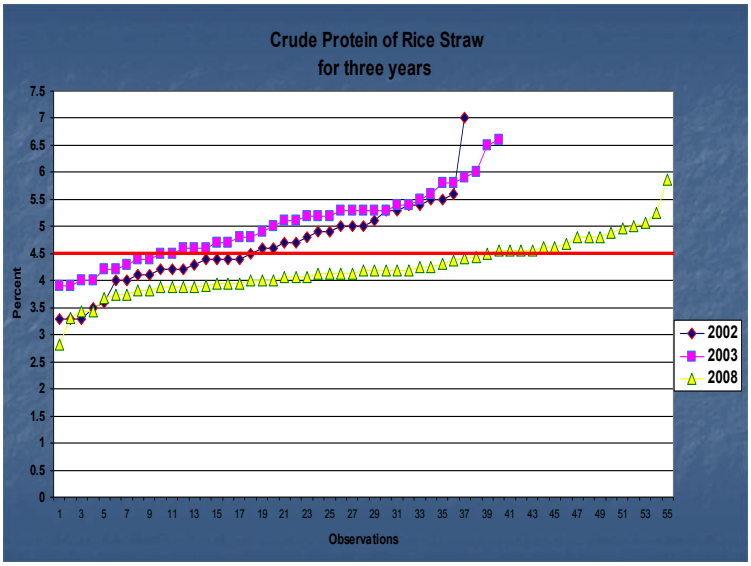
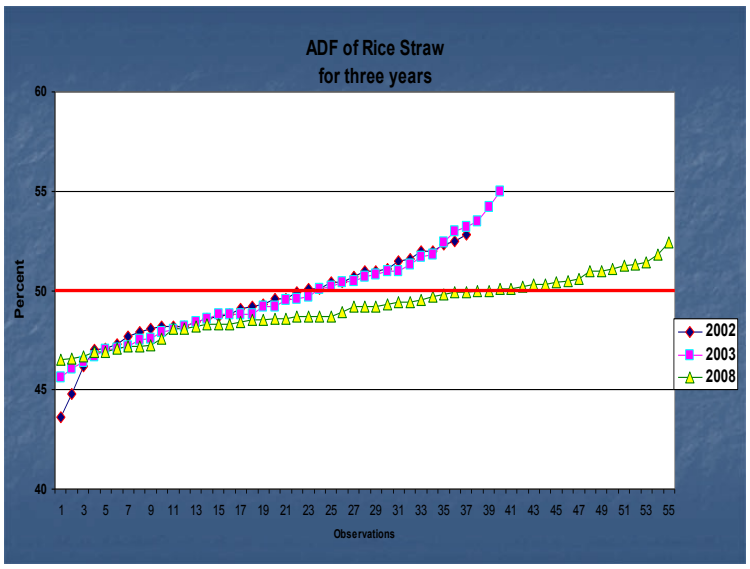


Figure 2. Rice Straw Acid Detergent Fiber (ADF) Variability



The University of California has developed nutritional testing recommendations for rice straw to enable purchasers to optimize the beef cattle performance when feeding rice straw as a part of the diet. Forage value criteria for rice straw for beef cattle is suggested to be:

Crude Protein of 4.5% or higher
ADF of 50 % or lower
Moisture of 12% or lower

Label Restriction for Straw use for Livestock

You should ask the farmer about the label on all herbicides, desiccants, and pesticides applied to see if their application will restrict your ability to use the straw for feed.

For more information on rice straw go to one of the following publications.
Feeding Rice Straw to Cattle - http://anrcatalog.ucdavis.edu/pdf/8079.pdf
Rice Producers Guide to Marketing Rice Straw- http://anrcatalog.ucdavis.edu/pdf/8425.pdf
Rice Straw Use in Dairy Heifer Rations - http://anrcatalog.ucdavis.edu/pdf/8392.pdf

Corn Stover or Baled Corn Stocks

An Oregon State study on corn stover is reported below and illustrates the variability of that product.

Corn Stover Analysis Results

	DM	CP	TDN	NO3-N
1	85.8	3.7	53.4	
2	82.1	4.5	52.5	1270
3	84.6	5.1	54.3	1560
4	77.8	5.2	49.8	750
5	84.8	3.9	55.2	705
Average	**83.02**	**4.48**	**53.04**	**1071**

all results are reported on a Dry Matter basis

Feeding of corn stover is best utilized by placing bales in feeders. Ranchers have observed more loss or waste when just placing the bales free choice in the field that usually does not occur with rice straw. Corn stover that have the stocks chopped before baling allow for more complete consumption. Nitrates can be a problem in corn stover, especially if non protein nitrogen supplements are being fed. Analysis for nitrates may also allow for prudent management of feed for the safety of the cattle.

Bean or Pea Straw

Farming operations that grow peas or beans for human consumption have residue (straw) that can be baled after harvest. The material is dry, and ranchers report that during the first few days that the cattle will slowly get use to it as a forage. Growers with drip tubes on the field will have a concern about soil compaction. Keeping the baler and harrowbed tires in the down furrors can minimize the impacts.

Sampling stacks of straw

If you are sampling the stacks of baled straw after harvest to determine if the straw meets quality specifications, take core samples from at least 25 bales and place them in a labeled, sealed zip lock bag and deliver to the laboratory for analysis. Hay sampling probes can be purchased locally in California. Have the samples analyzed for CP and ADF at laboratories that provide forage evaluation. For more

information on forage testing process and equipment go to National Forage Testing Association website at http://www.foragetesting.org/index.php?page=forage_sampling

Rice Straw Haylage

An experimental process of baling rice straw right behind the harvester at 50 to 65% moisture to increase the quality has been conducted for 3 years. University research has demonstrated that during the drying process rice straw greatly decreases in digestibility (27%). The haylage process involves placing the big bales in a two wide by three high stack that is covered by a 100 x 40 foot tarp. The bales go through a sweat with temperatures around 130 degrees the first 4 days after baling. They then go down to 90 degrees. From 30 to 45 days they can be fed. Intakes are almost double of dry straw. More nutritional information will be available in late February 2014, but previous year's data indicated an increase in available energy. Mold formation throughout the stack and water condensation on the top bales under the tarp are two hurdles that need to be addressed. It appears that application of Quadris to control diseases during production may be reducing mold formation. In the past, nitrogen application and propionic acid were applied to improve nutritional value and stop mold. If the drought persists, this may be a process ranchers in the Northern Sacramento Valley may want to adopt to reduce their feed cost.

Snow Pea Haylage

In other productions areas, ranchers have found other crop residues for feeds. One rancher reported that he bales snow peas residue. Due to the thick stocks, he uses a fixed chamber Vermeer 404 Pro baler with 17 knifes that cuts the material into finer pieces for the cattle. They then wrap each bale in plastic with an Anderson wrapper.