

# Alternative Feeds for Beef Cattle<sup>1</sup>

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Cattle producers frequently seek low-cost feed alternatives, especially when traditional feeds are expensive. Many of these “alternative” feeds are by-products (or co-products) and waste products from the processing of various food and fiber crops, or crop residues. These alternative feeds can fit into a feeding program as the primary roughage, as a supplement to a regular ration or when grazing pasture, or as a replacement for part of the ration or pasture.

Listed below are factors that one should keep in mind when selecting and using alternative feeds for beef cattle:

1. **Accurate identification** of alternative feed.
2. **Availability and consistency of availability.** The supply and quality of many alternative feeds are inconsistent.
3. **Nutrient composition and nutrient availability.** Test nutrient composition before purchase and feeding, especially if you intend to feed a large amount. Table 1 lists average or typical compositions of several locally available alternatives. *Please note that alternative feeds, in general, are more variable in composition and quality than traditional feeds such as corn.*
4. **Consistency of composition.** Composition can vary not only from source to source, but it also can vary from lot to lot, or even within the same lot from the same source.
5. **Suitability.** Be sure that the alternative feed is suitable for the class of animals to be fed (e.g., a bulky, low-nutrient-density feed may not be desirable for growing animals but may be suitable for mature cows).
6. **Perishability.** Factors that can influence perishability include moisture level, fat content and composition, storage method, storage management, storage time, etc.
7. **Freedom from health hazards.** Feeds can contain toxic substances, disease organisms, and/or other contaminants. Do not use contaminated feed unless you can eliminate or neutralize the contaminants inexpensively.
8. **Special handling, processing, and storage requirements.**
9. **Effect on end product.** The alternative feed when included in the diet should not harm the end product. It should not affect the taste and/or quality of the meat or compromise food safety.
10. **Storage space.**
11. **Legality.** Be aware that some feeds such as meat and bone meal derived from ruminant animals (cattle, sheep) are illegal to feed to cattle. Also, be aware that some pesticides used in crop production may make crop residues unsuitable for cattle and illegal to feed to them.

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Use pesticides safely. Read and follow directions on the manufacturer's label.

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12. **Cost.** In addition to purchase price, consider added costs associated with the use of an alternative (e.g., transportation, special handling and processing, and storage).

## Local Alternative Feeds

The following section discusses the advantages and disadvantages of some alternative feeds available locally. Although not discussed for each individual feed, keep in mind *pesticide residues and label restrictions when purchasing an alternative feed*. Table 1 lists average composition, but be aware that average composition can vary greatly.

**Cane Molasses**—is a by-product from the manufacture of sugar. Molasses is extremely palatable and an excellent source of energy. Molasses is commonly blended with urea, vitamins, and minerals.

**Citrus Pulp**—is formed by shredding, liming, pressing, and drying the peel, pulp, and seed residues from citrus fruit. Citrus pulp is a low protein, high fiber feed that is very digestible. Dried citrus pulp is an excellent feed. Wet citrus pulp or waste citrus fruits may be economical, especially near citrus processing plants.

**Soy Hulls**—are a by-product of the soybean oil milling process. This is a very digestible high fiber feed, and a good source of protein. They are an excellent supplement for forage based rations (grazing, hay, or silage). Soy hulls are most effective when limited to 30% of the animals' intake. Although they contain a good deal of fiber, soy hulls are not a desirable fiber source in a finishing diet. They are a bulky, dusty feed and work best when fed pelleted or when mixed with silage or molasses to reduce dust.

**Hominy Feed**—is a by-product in the manufacture of hominy grits from corn. This product is a mixture of bran, germ, and part of the starch portion. It must contain not less than 4% fat. Hominy feed is palatable to livestock and is about equal to corn in energy value, but is variable in composition. Levels of 50% or more of the concentrate mix have been used successfully in cattle rations, however, 10 to 15% is more common.

**Brewers Grain**—is a by-product of the production of beer, and is an excellent source of protein and a good source of energy. It is highly palatable and can be used in a variety of rations. Most breweries offer this by-product only in the wet form (70 to 80% moisture); therefore, transportation costs are high. Unless stored in trench or bunker silos, the shelf life is limited to 3–5 days. The storage and cost of

handling usually limit the use of brewers grain to relatively large cattle operations located near a brewery.

**Corn Distillers Grains**—are a by-product of corn dry milling in which starch is fermented to ethanol. Both the protein and energy contents are high. The most common form is dried distillers grain plus solubles, or DDGS.

**Corn Gluten Feed**—is a by-product of the corn wet milling process. It consists primarily of bran from the grain after the starch and oil are removed. The protein content is good (26%). Corn gluten is not produced locally; however, consider it a protein and energy supplement because it is frequently cheaper than other feeds.

**Cottonseed (whole)**—is an excellent source of both energy and protein and is readily available in cotton-producing areas. Levels included in stocker or finishing rations should not exceed 20% of the ration. For brood cow supplements, the level fed should not be greater than 5 lb/head/day. Because of the possible detrimental effect of gossypol on male fertility, avoid feeding cottonseed to bulls. Be aware that improper storage before or after delivery can lead to mold and mycotoxin problems. Whole cottonseed is rather bulky and does not flow well in self feeders.

**Peanut Meal**—is the residue left after the oil is extracted. It is high in protein (40–45%) and a good substitute for other protein supplements such as cottonseed meal. Be aware of possible aflatoxin contamination.

**Corn Stalks, Grain Sorghum Stalks, Wheat Straw, and Soybean Stubble**—are the stem and leaf materials that remain after the grain has been harvested. Because of their low nutrient content, these crop residues are used as forages in special situations. Their best uses appear to be:

- **Grazing**—corn fields and sorghum fields provide good forages for cattle in the fall of the year. These fields can provide up to 30 cow-grazing days per acre if used before heavy winter rains.
- **Hay**—These residues can be harvested for hay. Their nutrient content is low; however, the amount of dry forage that can be baled makes them attractive during periods of drought. Research has shown that the quality of corn stalks and wheat straw is greatly improved when they are treated with anhydrous ammonia. Your county Extension agent should be able to assist you with details.

**Note:** When feeding or grazing soybean stubble, do *not* offer a supplement containing urea. The combination of

urea plus raw soybeans can cause sickness or death from nitrate toxicity.

**Cotton Gin Trash**—is a by-product of the cotton ginning process. It contains boll residues, leaves, stems, and lint. This composition makes it a very bulky, unpalatable, high fiber, low energy feed. Its only practical use is in hay-replacer rations when mixing it with another feed, which is more economical than buying hay. Generally, it is a very inexpensive feed with limited uses. Reducing the particle size by grinding makes it easier to handle and will improve intake.

**Cottonseed Hulls**—are a high-fiber, low-protein by-product of the cotton industry. They are high in crude fiber that is not very digestible, but are more palatable than many other sources of fiber. Hulls are a very bulky feed that has excellent mixing qualities in concentrate rations at low levels. They should only be used as a roughage source at low levels (10 to 25%) for growing and finishing cattle. They will work well in hay-replacer rations for brood cows if they are cost effective.

**Peanut Hay**—consists of the vines and leaves of the annual peanut plant after the peanuts have been combined. Protein content of peanut hay is fair to good, while energy content is low. The coarse nature of peanut hay will result in a high degree of spoilage unless protected from rain. (Please note that certain chemicals used in peanut production are not cleared for the feeding of crop residue to livestock. Please read the label). This peanut hay should not be confused with perennial peanut hay. For more information on perennial peanut forage, please refer to the EDIS publication by Myer et al. (2010).

**Peanut Hulls**—are the by-product of the peanut shelling process. They are high in fiber and very low in energy and protein. Peanut hulls are extremely bulky and hard to handle. Availability is good if you are located near a shelling plant.

**Wheat Middlings**—are a by-product of flour milling. Midds consist of bran, germ and some flour, and offal and dust from the “tail of the mill.” Midds are rather bulky and dusty, but are a good source of both energy and protein.

**Cull Vegetables**—are sometimes available. These culls are very high in water (~ 80 to 95%), but on a dry basis are good energy sources.

**Rice Bran**—is a by product of rice milling. Rice bran is high in fiber and is rather bulky, but is high in nutritional

value. Rice bran can easily become rancid due to its high unsaturated fat content.

**Rice Mill Feed or Rice By-Product**—is a by-product of rice milling and is about one-third rice bran and two-thirds rice hulls. This product has a low feed value due to the presence of the hulls.

## Determining the Value of an Alternative Feed

An alternative feed should supply energy, protein, and/or roughage. Accurate nutrient composition of an alternative will allow one to use the feed correctly and to estimate its value vs. that of traditional feeds accurately. An approximate value can be calculated by using energy and protein concentrations, which are of course the largest components of a ration. The relative dollar values of locally available by-products, residues, and waste products are listed in Table 2. The value for each feed was estimated on an as-fed (fresh) basis by considering its energy and protein contents relative to cottonseed meal at \$320 a ton and corn at \$4.00 per bushel. The information in Table 2 may be useful, but there are no considerations for palatability, handling, storage, or maximum percent that can be used in a ration. Use these estimated values only as guidelines. The actual value to a specific cattle operation will change depending upon the nutrient content and the actual cost of corn (or other energy supplements) and cottonseed meal (or other protein supplements). Apply rules for good nutrition and ration balancing after you have identified the most economical alternative feeds. Further information and help can be obtained from your local UF/IFAS Extension agent.

## Summary

Many alternate feedstuffs for beef cattle are available locally. As presented in Table 2, many are excellent bargains while others are not. Please note that there are many other possible alternative feeds available that were not discussed in this publication. Each producer must decide if a specific feed is economical to use and whether it fits into a particular farm situation.

## References

Kunkle, W.E. 2001. Strategies for cost effective supplementation of beef cattle. Gainesville: University of Florida Institute of Food and Agricultural Sciences. <http://edis.ifas.ufl.edu/an085>.

Kunkle, W.E., R.L. Stewart, and W.F. Brown, 2001. Using by-product feeds in beef supplementation programs. Gainesville: University of Florida Institute of Food and Agricultural Sciences. <http://ufdc.ufl.edu/IR00001625/00001>.

McCann, M.A., and R. L. Stewart. [revised 2011]. Use of alternate feeds for beef cattle. [http://www.caes.uga.edu/Publications/pubDetail.cfm.?pk\\_id=6893](http://www.caes.uga.edu/Publications/pubDetail.cfm.?pk_id=6893).

Myer, Bob, Lori Warren, Juliet Eckert, Dennis Hancock, Ann Blount, and Clay Olson. 2010. Perennial peanut: forage nutritional composition and feeding value. Gainesville: University of Florida Institute of Food and Agricultural Sciences. <http://edis.ifas.ufl.edu/an234>.

Myer, Bob, Lori Warren, Juliet Eckert, Dennis Hancock, Ann Blount, and Clay Olson. 2010. Perennial peanut: forage nutritional composition and feeding value. [edis.ifas.ufl.edu/AN225](http://edis.ifas.ufl.edu/AN225).

Table 1. Nutrient Composition of Alternative Feeds.

Feed	Percent of Dry Matter <sup>a</sup>						
	DM	CP	TDN	CF	Ca	P	Ash
<b>Energy Feeds</b>							
Cane Molasses	74.0	6.0	72	0.5	0.01	0.10	13.0
Citrus Pulp	90.0	6.5	78	13.0	1.90	0.13	6.0
Hominy Feed	91.0	11.5	90	7.0	0.06	0.58	3.1
Soy Hulls	91.0	12.0	80	39.0	0.60	0.17	4.0
Rice Bran	91.0	13.0	70	12.0	0.10	1.50	5.0
Wheat Midds	89.0	18.0	70	8.5	0.15	1.00	5.0
Vegetables Cull	9.0	10.0	70	8.0	0.2	0.5	3.0
<b>Protein Feeds</b>							
Brewer's Grain	24.0	26.0	71	15.0	0.30	0.57	5.0
Corn DDGS	90.0	23.0	88	12.0	0.35	1.40	4.5
Corn Gluten Feed	90.0	22.0	83	10.0	0.50	0.90	6.0
Cottonseed (whole)	93.0	28.0	90	22.0	0.20	0.73	4.0
Peanut Meal	88.0	52.5	77	2.3	0.32	0.66	6.3
<b>Roughages</b>							
Rice Mill Feed	92.0	7.0	50	34.0	0.10	0.60	18.0
Corn Stalks	85.0	6.6	50	34.0	0.50	0.10	7.2
Cotton Gin Trash	92.0	7.4	44	38.0	0.60	0.20	10.0
Cottonseed Hulls	91.0	4.1	45	48.0	0.10	0.07	2.8
Sorghum Stalks	85.0	5.6	50	33.0	0.40	0.10	10.0
Peanut Hay	91.0	10.8	48	33.0	1.20	0.15	8.6
Peanut Hulls	91.0	8.5	22	63.0	0.20	0.07	4.0
Wheat Straw	92.0	4.1	40	42.0	0.17	0.04	10.0
<sup>a</sup> DM = dry matter; CP = crude protein; TDN = total digestible nutrients; CF = crude fiber; Ca = Calcium; P = Phosphorus.							

Table 2. Estimated Value of Alternative Feeds\*.

<b>Energy Feeds</b>	<b>Relative Value ** \$/ton</b>
Citrus Pulp	120
Soy Hulls	145
Hominy Feed	155
Wheat Midds	135
Rice Bran	120
<b>Protein Feeds</b>	
Brewer's Grain	50
Corn Gluten Feed	160
Corn DDGS	170
Cottonseed (whole)	175
<b>Roughages</b>	
Rice Mill Feed	65
Corn Stalks	60
Cotton Gin Trash	45
Cottonseed Hulls	50
Sorghum Stalks	60
Peanut Hay	80
Peanut Hulls	25
Wheat Straw	45
*Maximum amount one could pay minus extra costs associated with special handling, storage, etc.	
**Relative value compared to corn at \$4.00 per bu (\$145 per ton) and cottonseed meal at \$320 per ton.	