

By-Product Feeds for Alabama Beef Cattle

Feed costs represent the largest single cost item in most beef operations. In many economic analyses, feed costs represent more than 50 percent of the variation in profit or loss differences between herds. This publication provides an in-depth look at several alternative beef cattle feedstuffs that have the potential for greatly reducing feed costs.

Many beef producers utilize by-product feeds on a routine basis, while numerous others utilize them only sporadically, such as during drought conditions when available forage is limited. This publication will discuss the energy value of various feeds in terms of TDN (total digestible nutrients). For the TDN requirements of various classes of beef cattle, see Extension publication ANR-60, "Nutrient Requirements of Beef Cattle." While this publication does not include all by-products, it does discuss many of those being used in Alabama.

Several important points should be considered when evaluating a particular by-product as a cattle feed. These include moisture content; nutrient profile; contaminants; transportation and storage; availability; and regulations.

Moisture content. Many by-products contain excessive amounts of moisture that can create several problems. A typical high-moisture by-product is wet brewer's grain that typically contains 70 to 80 percent moisture. The first problem created is transportation since 18 tons of water and only 6 tons of feed are moved for every 24-ton load. This is not very cost effective at current trucking costs. When considering



a pit or other storage facility for by-products containing this much moisture, keep in mind the potential for rapid spoilage when this by-product is exposed to air. If these obstacles can be overcome, other factors regarding ingredients in the final diet should be considered. Will a by-product that contains 75 percent moisture blend adequately with other ingredients that may contain only 12 percent moisture? What type of feeder will be needed? Is the mixer truck or wagon capable of handling this blend? The last consideration of a high-moisture by-product seems simple but is often overlooked by many producers—pricing. Often, producers hear the \$20 per ton price and forget that for a by-product that contains 75 percent moisture, the cost is actually \$80 per ton on a dry weight basis.

Nutrient profile. Some by-products may have uncharacteristic nutrient profiles. For example, citrus pulp contains large amounts of calcium, especially relative to the phosphorus content. Other examples include high fat concentrations in whole cottonseed,

whole soybeans, and rice bran. Likewise, some human food wastes may contain excessively high salt concentrations.

Contaminants. An unlimited potential for including numerous contaminants exists when feeding by-products. For example, the by-product gin trash may include something as simple as unwanted weed seeds or as complex as pesticide residues. Some by-products may have concentrated amounts of mycotoxins as a result of screening or sorting procedures. Contaminants may also be as simple as unwanted trash. For example, the cull candy at a candy factory may be placed in a bin until it is full then loaded onto a truck for use as cattle feed. An unknowing or uncaring employee may see the bin for cull candy and assume that it is a place to dispose of an unwanted piece of paper or other trash item. By using the bin for trash, the person contaminates the candy to be used for cattle feed.

Transportation and storage. Most of the cost associated with the use of by-products for cattle

feed comes from moving them from the point of origin to the feeding location. In today's economy, a good rule of thumb is to estimate that it will require approximately \$2 per loaded mile to transport the product. Obviously, small quantities in a local market do not fall under this general estimate. Many by-products are transported as 24-ton loads by tractor-trailers and require adequate facilities to handle the deliveries. First, it is imperative that the farm have adequate space for entry, turn-around, and exit of these large trailers. If the by-products are to be unloaded into storage bays, an absolute minimum width is 14 feet. Eave height will always be a problem if dump trailers are used; however, trailers with live bottoms or a walking floor can unload easily into a bay or shed with an eave height of 16 feet. When planning such a facility, it is always better for it to be too large rather than too small. Also, plan to have the bay accessible from both sides. When a new load of feed is added, you can begin accessing from the opposite side. This way the older feed is used first.

Availability. Consider seasonal availability. Many by-products are produced all year, while supplemental feeds for cattle may only be needed when forage is unavailable. Thus, storage facilities are needed so the by-product can be bought when its price is lowest. It can then be fed at a later date when needed. If you wait until the feed is needed, you are at the mercy of the markets, and the by-product may no longer be economical.

Regulations. Any potential regulations concerning a by-product feed should always be considered. Accepted by-products have been defined by the American Association of Feed Control Officials and, therefore, must be sold with a guaranteed analysis.

The use of by-products as nutrient sources for beef cattle will continue to be driven by economics. As landfill prices continue to escalate, by-products will become more economically

viable as cattle feed. These considerations will be counter-balanced by wholesomeness concerns. American consumers are becoming more concerned with the production aspects of their food. The environmental concerns associated with additional landfills will have to be balanced against how many by-products and which ones consumers will accept in the production of the beef they consume. These issues are expected to heighten in the coming years.

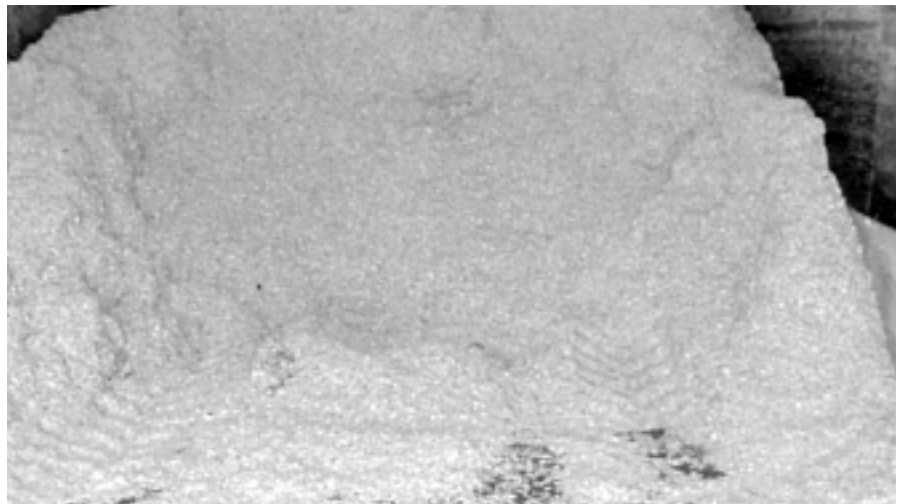
Cotton

The cotton industry, quite prevalent in Alabama, generates several by-products that are used as beef cattle feeds. These are whole cottonseed, cottonseed hulls, cottonseed meal, gin trash, and cotton mote. As cotton is ginned, the gin trash is sent outside of the gin and stacked in large piles; the seed is extracted from the boll. Ginned cotton is used in textile mills for the manufacture of various cotton products. At the textile mill where yarn is produced, the cotton is further refined. The by-product from this procedure has been referred to as cotton mote by many producers. It should be referred to as textile mill waste since some gins also produce what is referred to as cotton mote. The seed can also be further processed for the extraction of the oil. The two remaining

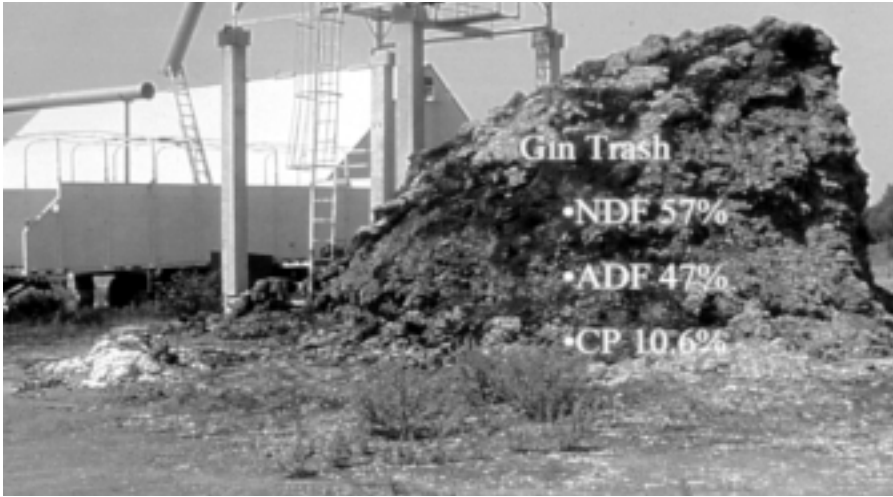
products are cottonseed hulls and cottonseed meal.

Whole cottonseed. Cottonseed can produce abundant amounts of energy. A very good source of protein, cottonseed will typically contain 90 percent TDN and 24 percent crude protein. The limiting factor for its use in beef cattle diets is the fat content, which is approximately 24 percent. In general, mature cows can be fed 6 to 8 pounds per day, while replacement heifers and stocker steers should be limited to about 4 to 5 pounds per day. The seed can be fed on clean sod daily or every other day, or it can be offered in feeders in a 3- to 4-day-at-a-time supply. Once cattle are adapted to whole cottonseed, the fat content becomes an intake limiter. It should not be fed in self-feeders with a V-shape because the fuzzy seed will bridge and cattle will not have continual access to the feed. For this same reason, cottonseed should be stored in a covered shed or feed bay and not in feed bins. Fuzzy seed will not auger or gravity-flow very well. Seed is generally handled with front-end loaders or by hand.

Since whole cottonseed is low in calcium content, the mineral being fed should contain adequate quantities of calcium. Cottonseed contains a toxic compound called gossypol. In general, gossypol causes male infertility problems, so feeding it to bulls can be a



Whole cottonseed



Gin trash

concern. The scientific literature contains many studies on this topic, and the results are mixed. It appears there are two isomers of gossypol: one is toxic while the other possesses very little activity. Upland cotton appears to contain less of the toxic isomer than does Pima cotton. In the Southeast, most of the cotton is of the Upland type, so, in Alabama, bull infertility as a result of cottonseed consumption appears to be a minor problem.

Cottonseed meal. Cottonseed meal is an excellent source of natural protein for beef cattle. As a supplement to forage, it works quite well when desired supplement intakes are in the range of 2 to 4 pounds per day. It works well when fed as a hot-mix (i.e., mixed with salt so it can be offered free-choice in self-feeders). See Extension publication ANR-288, "Feed Intake Limiters for Beef Cattle," for a full discussion of this practice. Cottonseed meal contains 44 to 45 percent crude protein (dry matter basis), 75 percent TDN, and, like whole cottonseed, can contain gossypol.

Cottonseed hulls. Cottonseed hulls are a very palatable roughage source. They are extremely low in nutritive value (42 percent TDN and 4 to 5 percent CP) and should only be used as a source of roughage. Because of their ease of handling compared to grinding hay, they are a popular roughage

source for high-grain diets. Generally, they are overpriced compared to other nutrient sources; however, if it is important to mix a roughage source into a complete diet and grinding hay is not an option, then cottonseed hulls may be useful.

Gin trash. Gin trash consists of everything that was in raw cotton except the cotton fiber and the seed. Many of the gins in Alabama produce trash that contains approximately 45 to 48 percent TDN and 7 to 9 percent CP. In various substitution research trials across the state, palatability has been good in both stocker calves and brood cows. Gin trash makes an excellent roughage source for mixing with broiler litter. The biggest deterrents to its use as a roughage source are those associated with logistics. It is very dusty when handled and is quite bulky for transportation. Another factor to consider is that many gins will add water as the material is being expelled from the gin to decrease potential dust problems. With a wet product, the stack may undergo heating to such an extent that many of the nutrients become bound and less digestible. Some of this material will actually have a charred appearance.

Cotton mote. If available, cotton mote is one of the preferred roughage sources. Similar to gin trash, cotton mote generally contains 45 to 50 percent TDN and 7

to 9 percent CP. However, unlike the gin trash, the logistical problems are minimal with cotton mote. Most of the material used in Alabama is baled into a 4' x 4' x 5' bale. The handling and feeding equipment used for large, round bales of hay can be used for this by-product. Palatability has not been a problem with most of this material.

Peanuts

Peanut production is prevalent in the southern half of Alabama. Peanuts create several by-product feeds including broken and cull nuts, skins, hulls, and vines that are used as a hay crop.

Raw peanuts. Because of their high monetary value, very few whole peanuts are used as cattle feed, although they can be used when available. The nutritional analysis is as follows: 38 percent fat, 24 percent protein, and 95 percent TDN. Similar to whole cottonseed, the limiting factor is the fat content. A maximum of about 4 pounds per day for grown cows should be recognized. As with any feed containing a high fat content, introduce it to cattle gradually. Indications are that cattle will readily consume peanuts in the shell. Occasionally, raw peanuts are available as a result of aflatoxin contamination. In this case, an accurate measurement of the aflatoxin concentration should be determined and the feed used accordingly. In general, beef cattle can tolerate up to 200 to 400 ppb in their diet depending on size and age of the animals.

Peanut skins. As one might guess, peanut skins have a very low bulk density and, therefore, create some logistical problems with their handling. The average chemical composition is 25 percent fat, 17 percent protein, and 65 percent TDN. A substantial amount of tannins are also found in peanut skins (approximately 20 percent). Tannins are unpalatable and also bind protein in the diet, making it less digestible. Research conducted to evaluate the use of peanut skins

in cattle diets indicates they should not exceed 15 percent of the total diet. When incorporated at or near the 15 percent level, the diet should contain excessive quantities of protein to offset the negative effects of the tannins.

Peanut hulls. Peanut hulls are a roughage source and nothing more. They contain 7.5 to 8 percent protein and 22 percent TDN—very low quality. When other roughage sources become limited, such as during a drought, many producers consider using peanut hulls. In various studies, researchers at Auburn University fed up to 55 percent peanut hulls for 112 days with acceptable results. **It is very important to use whole peanut hulls and not finely ground or pelleted peanut hulls.** When the hulls are finely ground, they lose their effectiveness as a fiber source and can, in fact, have negative health consequences. Georgia research shows that feeding ground or pelleted peanut hulls causes damage to the rumen wall of cattle and liver abscesses in 55 to 60 percent of the cattle that were fed these hulls for 135 days.

Peanut hay. Peanut hay can be a high-quality winter feed when properly cured and baled. Most of the peanut hay that has been analyzed at the Auburn Forage Testing Lab contains 13 to 17 percent protein and 52 to 57 percent TDN. Peanut hay is extremely palatable to beef cattle. If excessive rain falls on the vines while curing, mold can be a problem as well as elevated ash content as a result of the inverting process that places soil on the vines. Finally, all peanut hay should be wrapped or stored inside because excessive dry matter and nutrient loss will occur with unprotected bales.

Soybeans

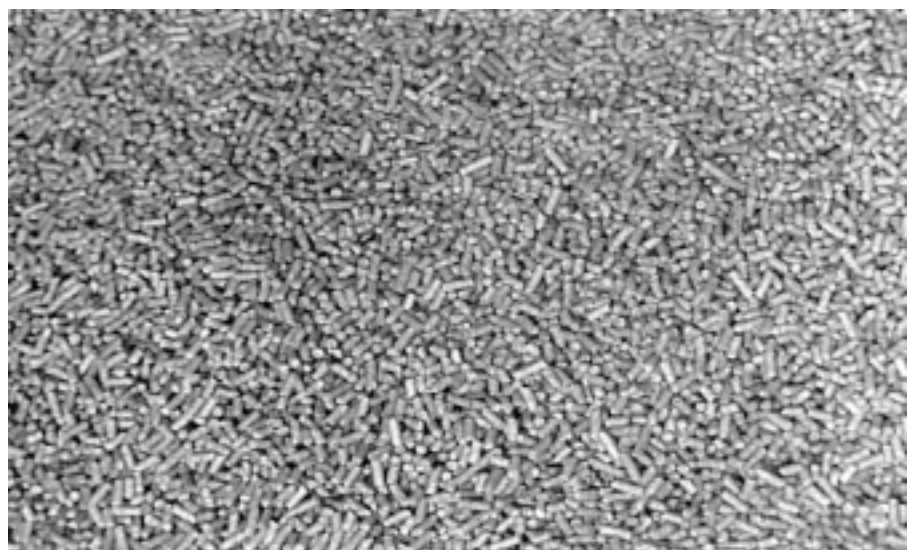
Whole soybeans. The nutritional analysis of soybeans indicates they contain approximately 20 percent fat, 42 percent protein, and 90 percent TDN. Raw soybeans contain urease and should not be used with feeds that contain urea or nonprotein nitrogen. Based on

their fat content, cattle should be eased onto whole soybeans to prevent rapid diarrhea. The cattle should be increased up to about 5 pounds per head per day and, once adapted, may consume as much as 6 or 7 pounds per day. The whole soybeans should be coarsely ground for optimum utilization. When soybeans are ground through a hammermill, they can become gummy. To help reduce this problem, mix the soybeans with corn or other feedstuff before grinding. Palatability is generally not a problem.

Soybean hulls. Soybeans are primarily processed for their oil, which leads to the generation of two primary by-products, soybean meal and soybean hulls. Soybean hulls are actually the skins of the soybean, which come off during processing. These soyhulls are quite small and not very dense. Therefore, many soyhulls are pelleted to increase ease of handling and bulk density. The loose and pelleted hulls are equal in nutritional value.

Most of the time, soyhulls are priced competitively with corn. To determine which is a better buy, we must first determine how they compare nutritionally. Corn contains 90 percent TDN and 8 to 10 percent protein. Soyhulls are more difficult to determine; three different publications give them three different energy values. The 1984 NRC publication for beef

cattle lists them at 64 percent TDN, the 1996 NRC for beef cattle lists them at 80 percent TDN, and the latest NRC for dairy cattle assigns them a value of 77 percent TDN. All agree that soyhulls contain approximately 12 percent crude protein. Why this discrepancy in TDN content? Primarily because of the way they are used. If we were to feed a group of cattle a diet that contained 90 percent corn and another group a diet that contained 90 percent soyhulls, the results would show that corn would provide 10 to 20 percent faster gains than the soyhulls provide. However, when we feed diets that contain only a small portion as corn or soyhulls then the soyhulls provide gains equal to those provided by the corn. For example, we have a group of cows that have just begun calving. They have been consuming about 25 pounds of hay per day, but now that they are calving, they need a supplement. Let's compare corn and soyhulls. We supplement with 5 pounds of corn per day. The end result is that the cows are now consuming the 5 pounds of corn, but their hay consumption drops to about 18 or 19 pounds per day. Their total energy intake is still greater than it was when they were consuming 25 pounds of hay, but the corn has a negative impact on total intake (now at about 23 or 24 pounds) and will also decrease the digestibility of



Pelleted Soyhulls

the hay. The comparison is that we supplement with 5 pounds of soyhulls per day. The final result is that they consume the 5 pounds of soyhulls and about 21 to 22 pounds of hay per day, and the digestibility of the hay may be improved. Even though the soyhulls contain less TDN per pound than corn, they are equal to the corn as a supplement for cattle consuming forages because of their positive impact on forage intake and digestibility. In addition to the positive effects with regard to the TDN fraction, the soyhulls also contain more protein than the corn.

In addition, soyhulls are an excellent creep feed. Many backgrounded calves have been weaned onto free-choice soyhulls and gained in excess of 2 pounds per day for a 45-day backgrounding period. Soyhulls are extremely palatable and thus make an excellent choice in weaning diets.

In spite of all the positive attributes of feeding soyhulls, some negatives do exist. At high levels of intake (greater than 7 pounds per day), soyhulls are conducive to bloat, and a bloat preventative should be used. A satisfactory method would be to feed a mineral supplement containing an ionophore, such as Rumensin or Bovatec, or to mix the ionophore straight into the feed. Always provide some access to long-stem roughage, whether it be hay or grazing. Quality of the roughage is not as important as particle size. Bloating has only been a problem in growing calves; brood cows are not prone to bloat as a result of consuming soyhulls.

Wheat

During the wheat milling process, about 75 percent of grain becomes flour and the remaining 25 percent is used as livestock feed. The resulting by-products are referred to as millfeed, wheat mill run, or wheat middlings (midds). There is little consistency in terminology when talking about these products, and, in general, they are brokered in various com-

binations and marketed generically as wheat midds

Wheat midds. Wheat midds contain 17 to 18 percent protein and 73 to 80 percent TDN. Depending on the source, they are available as a loose meal or as pellets. The meal is fine and not very dense. Pelleted wheat midds cannot be stored for any length of time during hot, humid weather. The pellets readily absorb moisture, swell, soften, and fall apart. Pelleted wheat midds DO NOT react like other stored grain and will deteriorate rapidly. In the humidity of our state, it is best to get only a winter's supply instead of trying to store the pelleted wheat midds over the summer.

In research conducted at Auburn University, we have evaluated the use of wheat midds as a supplement for wintering brood cows. Supplementation with wheat midds compared favorably to supplementation with corn.

Research in Kansas and Oklahoma has shown wheat midds to be equal to corn and soybean meal as a winter supplement for brood cows consuming low to medium quality forage. Results from South Dakota and North Carolina have shown that calves can be backgrounded on free-choice hay and free-choice wheat midds with daily gains of 1.7 to 2.0 pounds per day. In these trials, the researchers reported no problems with bloat or acidosis. Remember that some danger always exists when feeding concentrates free choice.

Rice

Most of the rice in the United States is milled in Arkansas; however, the by-products can be shipped to Alabama at competitive prices. Paddy rice is harvested from the field. After drying, the first milling step is to remove the hull, yielding brown rice and rice hulls. Then the outer layer is removed from the brown rice to yield white rice and rice bran. The by-products available for cattle feed are rice hulls, rice bran, and a combination of the two, which is referred to as rice mill feed.

Rice hulls. Rice hulls do not burn easily, do not absorb water readily, and deteriorate very slowly. It should not be surprising that their nutritional value is quite low. Most of the rice hulls are blended with rice bran so they can be fed in the form of rice mill feed.

Rice bran. Rice bran is a finely ground material that generally contains 16 to 18 percent crude protein, 13 to 20 percent fat, and an extremely variable ash content. In an Auburn University study involving 88 weaned calves, half were offered free-choice hay and free-choice rice bran while the other half were offered free-choice hay and soyhulls equal to the level of rice bran consumption. During a 42-day backgrounding period, the calves offered rice bran consumed 6.5 pounds of hay per day and 8.25 pounds of rice bran per day with gains of .58 pounds per day. The calves offered the soyhulls consumed 6.9 pounds of hay and 8.25 pounds of soyhulls per day with gains of 1.14 pounds per day. Even with high fat content, rice bran contains substantially less energy than soyhulls contain.

Rice mill feed. This finely ground material is comprised of both rice hulls and rice bran. The material that we have used in our research has contained approximately 15 percent ash, 6 to 7 percent protein, and approximately 40 percent acid detergent fiber. Our goal has been to utilize the rice mill feed as a replacement for recently banned broiler litter as a low-cost major ingredient of the diet. In general, we were able to mix 50 percent broiler litter and 50 percent energy concentrate to yield gains of 2.0 to 2.25 pounds per day with 10 pounds of consumption per pound of gain when fed to stocker cattle or for backgrounding programs. In our initial studies, the rice mill feed has produced faster and cheaper gains than the typical broiler litter-based diets produced.

Corn

Corn grain is an extremely high-energy feed that is quite palatable to cattle. In addition, several by-products from corn can also be used as feed for beef cattle. Some of the common corn by-products used in Alabama are hominy feed, corn gluten feed, and corn screenings.

Hominy feed. Using the dry milling process, corn is used to produce corn meal, hominy, and grits for human consumption. One of the resulting by-products from this process is hominy feed, a mixture of corn bran, corn germ, and a portion of the starch. It will contain greater than 4 percent fat and 10 to 11 percent protein. Its feeding value is considered to be equal to that of corn. Hominy feed is a finely ground product that works well for mixing with other ingredients. In general, feed it in much the same manner that you would feed corn grain.

Corn gluten feed. This product results from the wet milling of corn to produce starch, oil, and syrup. The wet milling process involves steeping the grain in a dilute solution of sulfur dioxide. The various fractions are then separated. Corn gluten feed contains the bran and the steep liquor and may be marketed as either a wet or dry product. Processors differ in how they handle the product resulting in some variation among different lots of corn gluten feed. In general, the bran portion is partially dried by pressing, then the steep liquor is added to produce wet corn gluten feed (40 to 65 percent moisture content) or additional steep liquor is added followed by drying. Some processors may also add corn screenings to the final mix. In some cases the dried product will be pelleted. The product is fairly consistent when it comes from a particular processing plant but may vary from one plant to another. The crude protein content will be in excess of 18 percent and may be as high as 23 to 24 percent. The TDN content ranges

from 80 to 87 percent, and the variation is primarily a result of the drying process. Excessive heat results in a lower feed value, palatability problems, and usually a darker color.

In a Kentucky study, heifers grazing stockpiled fescue were supplemented with 9 pounds of corn, soyhulls, or corn gluten feed and daily gains were 1.45, 1.58, and 1.83 pounds per day for the three supplements, respectively. In research conducted in North Carolina, steers were supplemented with 6 pounds of a corn/soybean meal mix, corn gluten feed, or a 50:50 mix of the two. Daily gains were 2.76 for the corn/soy, 2.62 for the 50:50 mix, and 2.40 for the corn gluten feed. Soyhulls, corn gluten feed, or wheat midds were fed free-choice to calves consuming fescue hay. Those offered soyhulls consumed 19 pounds of soyhulls per day and gained 3.31 pounds per day, calves offered corn gluten feed consumed 13 pounds of supplement and gained 2.93 pounds per day, and those offered wheat midds consumed 12 pounds and gained 2.23 pounds per day.

Corn screenings. The first step of any grain processing method is to clean the seed. This is accomplished by screening so the dirt, dust, weed seeds, and small or broken grains are separated. Blowing air can also be used to remove the chaff and other lightweight material. Corn screenings consist of a mixture of these fractions. As one might imagine, corn screenings can be highly variable depending on the amount of each of these materials. A conservative approach is to consider the screenings to contain 65 to 70 percent TDN and 10 to 12 percent crude protein. The obvious problems with this product are weed seeds, high ash content (dirt and dust), and the possibility for mycotoxin contamination because the broken grains tend to be the ones most likely contaminated with mycotoxins.

Citrus Pulp

Most of the citrus pulp produced in the United States is in Florida, making it an economical feedstuff in Alabama where mid-winter purchases tend to be economical. In January, when many of the traditional energy feeds are more than \$100 per ton, citrus pulp can be purchased in the \$80 to \$85 per ton range. Citrus pulp contains approximately 82 percent TDN and less than 7 percent protein. Loose citrus pulp has a very low bulk density, so much of it will be pelleted to facilitate transportation. Common terminology will be to refer to the pulp as 80:20 or 60:40. These ratios indicate what percent of that load will be pelleted and loose. The pelleted pulp can be heat damaged during the pelleting process, so it is important to note the color of the pellets. Yellowish-orange is the original color with darkening toward a black color indicative of overheating.

Several research trials indicate that citrus pulp should be limited to 50 percent of a growing ration for beef cattle. In studies at Auburn University, we concluded that about 33 percent citrus pulp is the maximum before daily gains begin to fall below that of the control fed diets containing corn or soyhulls.

For brood cows needing 3 to 7 pounds of an energy supplement per day, citrus pulp makes an excellent choice as long as there is adequate protein in the base forage being consumed. For a lactating cow, as long as the base forage contains 10.5 to 11 percent protein, citrus pulp makes an excellent choice; however, if the hay contains less than 10.5 percent protein, a supplement with greater protein concentration will be needed. Young calves may initially have palatability problems with citrus pulp, but they will quickly become accustomed to it.



Wet brewer's grain

Brewer's Grains

In Alabama, most of the brewer's grains come from two breweries in Georgia. The product is wet with about 20 to 25 percent dry matter. First, it is important to realize that for each 24-ton load of wet brewer's grains purchased, 18 tons of water and 6 tons of feed are on the truck. If the price is \$20 per ton, the price on a dry basis is \$80 per ton. The TDN content of wet brewer's grains is 66 to 72 percent, and the crude protein content ranges from 25 to 30 percent.

Shelf life is a general concern when using any wet feed. Wet brewer's grain needs to be stored under anaerobic conditions for best results, although it can be stacked in an open bay if it is to be fed rapidly, especially during the winter

months. Free-choice fed 600-pound weaned calves consumed 24 pounds per day (6.2 pounds of dry matter) while grazing bermudagrass pastures and had gains of 1.56 pounds per day for 45 days post-weaning. The bottom line is that its usefulness is limited because of the high water content.

Candy

A considerable amount of candy that does not meet specifications for human consumption falls into the livestock feed channels each year. Most of the hard candy is predominantly sugar and can be fed with good results to beef cattle at rates of 10 to 20 percent of the total daily intake. It contains similar energy amounts to corn with little to no protein content.

Large quantities of chocolate candy should be avoided because of the amount of theophylline and theobromine in the chocolate. In addition, milk chocolate may contain as much as 28 percent fat and should be fed accordingly.

Individual pieces of hard candy are prone to agglutinating into large chunks under hot, humid conditions making handling of the product difficult. Candy should not be used as a sole supplement for beef cattle, but it can certainly be used for operations capable of mixing several commodities into a single diet.

Price Comparison

It is very difficult to simply compare all by-product feeds to a single corn price and determine their relative value. This can be done if we only consider their energy value (i.e., TDN content); however, if we look for both energy and protein, it becomes quite complex. Table 1 is a comparison to corn when we are **only** looking for an energy supplement. Some of these by-products have certain limitations, so refer to the previous text of this publication for those discussions. Table 2 shows the relative value of by-product roughage sources compared to average hay.

Table 1. Relative Value of By-Product Feeds With Varying Corn Prices

Corn Price (\$/ton)

	70	80	90	100	110	120
Whole cottonseed	70.00	80.00	90.00	100.00	110.00	120.00
Soybean hulls	70.00	80.00	90.00	100.00	110.00	120.00
Hominy feed	70.00	80.00	90.00	100.00	110.00	120.00
Citrus pulp	63.78	72.89	82.00	91.11	100.22	109.33
Wheat midds	60.67	69.33	78.00	86.67	95.33	104.00
Rice bran	54.44	62.22	70.00	77.78	85.56	93.33
Peanut skins	50.56	57.78	65.00	72.22	79.44	86.67
Corn gluten feed	66.89	76.44	86.00	95.56	105.11	114.67
Corn screenings	50.56	57.78	65.00	72.22	79.44	86.67

Values consider only the energy content and assume that they will be used as a supplement for cows consuming a forage-based diet. Protein content has not been considered and may be important for your situation.

Table 2. Relative Value of Roughage Sources if Hay Contains 52 Percent TDN and Is Priced at \$60 Per Ton

Gin trash	\$54.25
Cotton mote	\$54.25
Cottonseed hulls	\$48.50
Peanut hulls	\$25.50

Only energy value is considered, not protein.



Your Experts for Life

ANR-1237

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