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Cotton Gin Trash: Alternative Roughage Feed for Beef Cattle[1]

R. O. Myer[2]

Cotton production and processing are important to the economy in the southeastern United States. About 4.5 million acres of cotton are grown yearly in this region with an average yield of 1.5 bales per acre. The ginning of spindle-harvested cotton will typically result in 75 to 200 lbs of foreign material per 480 lb bale. This foreign material is "cotton ginning by-product," more commonly referred to as "cotton gin trash" or just "gin trash." This ginning by-product is composed of fragments of burs and stems, immature cottonseed, lint, leaf fragments, and dirt. Cotton gin trash is a disposal problem for cotton ginners. The most common disposal methods include direct land application and composting. However, gin trash is more than mere trash as it has nutritional value and may be used as a roughage feed for beef cattle.

The chemical composition of cotton gin trash is summarized in Table l. The nutritive value or feeding value of cotton gin trash is low. Additionally, it is common for cotton gins to remove extra seed, a process known as "double ginning", which results in gin trash with very low feed value. The low feed value is due to its high lignin and ash contents which have no energy value. Both crude protein and energy (TDN) concentrations are low. Overall, gin trash has a feed value similar to that of low quality bahiagrass or bermudagrass hay.

In addition to its low nutritive (feed) value, the composition of cotton gin trash varies greatly. A summary analysis of gin trash samples from 26 cotton gins collected in Georgia during the harvest season of 1997 is presented in Table 2. Composition varied widely with moisture ranging from 8 to 60%, crude protein from 2 to 16% and TDN from 16 to 62%! The variation in moisture was due in part to the practice of some cotton gins spraying water onto the gin trash to control dust and/or to hasten the composting process. In addition, at many gins the gin trash is stored outside and exposed to rainfall. Because of the wide range in nutrient content, it is suggested that a nutrient analysis be performed to properly design a feeding program using gin trash.

In spite of its low and variable feed value, gin trash can be an economical feed ingredient for beef cattle diets because the gin trash is usually free. The only costs are those associated with transporting, handling, and storage. The best use would be in diets for mature, gestating beef cows. These cows, have the lowest nutrient requirements of any class of beef cattle and can be maintained on diets high in gin

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2. Myer, R.O., Professor of Animal Science, University of Florida, NFREC Marianna

trash. Gin trash may also be used as a roughage source in diets for other classes of beef cattle, but is generally fed at a low percentage of the total diet. For example, finishing cattle are typically fed 5% of the diet or less of gin trash, just enough to help maintain proper function of the digestive system.

Pertinent points on feeding cotton gin trash to beef cattle:

1. Obtain and feed dry gin trash. Wet gin trash is not palatable and can become moldy.
2. Care should be taken to ensure dry storage.
3. Cotton gin trash is bulky and is expensive to transport.
4. The best use of gin trash is in diets for mature gestating beef cows.
5. Gin trash is best fed as part of the ration.
6. Gin trash is initially not palatable to beef cows when fed at high levels. The cows will take several days to adjust.
7. Cotton gin trash is extremely variable in composition.

Researchers in Georgia and Texas have tried to improve the feed value of cotton gin trash by the utilization of various chemical and processing techniques. While some of these techniques did show some promise, at this time, they are not practical or economical.

Chemical Residues

Chemical residues are often a concern when feeding cotton gin trash to beef cattle. Please note that many of the chemicals used in cotton production are not cleared for the feeding of crop residues, such as cotton gin trash, to beef cattle and other livestock.

Arsenic is no longer used in cotton defoliants and thus is no longer a concern. A study conducted in Georgia evaluated cotton gin trash for evidence of residues from pesticides used in cotton production. Only one residue, tribufos (DEF) – a commonly used defoliant, was found. The average concentration found was 4.5 ppm, which is low. While tolerance levels of DEF for two other cotton by-product feeds (whole cottonseed and cottonseed hulls) have been established, a tolerance level for cotton gin trash has not been established. Therefore even if chemical residue(s) are not detected in the gin trash, it is still illegal to feed the gin trash if DEF or other, non-cleared chemicals were used during the production of the cotton crop. This restriction is in place because of the potential for chemical residues to end up in beef products.

Summary

Cotton gin trash can be used as a roughage feed for beef cattle. Its nutrient content is similar to that of low quality grass hay. However, the nutrient composition varies widely. The best use of cotton gin trash is in rations for mature, gestating beef cows. Be aware that some pesticides that are cleared for cotton production may not be cleared for the feeding of crop residue, such as gin trash, to beef cattle.

References and Further Reading

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Table 1. Typical nutrient composition of cotton gin trash and its comparison to grass hay (dry matter basis).

Nutrient	Gin Trash	Grass Hay[a]
Dry matter, %	90	90
Crude protein, %	7	8
Crude, fiber, %	40	33
ADF[b], %	46	40
Lignin, %	14	9
Crude fat, %	2	2
Ash, %	10	8
TDN[c], %	44	50
NE_m[d], mcal/lb	0.35	0.40
NE_g[e], mcal/lb	0.03	0.15
Calcium, %	0.8	0.5
Phosphorus, %	0.2	0.2
Potassium, %	1.2	1.5
Magnesium, %	0.2	0.2
Sodium, %	0.1	0.1

[a]Coastal bermudagrass hay, 45-56 days maturity.
[b]Acid detergent fiber.
[c]Total digestible nutrients.
[d]Net energy for maintenance.
[e]Net energy for gain.

Table 2. Nutrient composition of cotton gin trash in Georgia (dry matter basis)[a].

Nutrient	Low	High	Average
Moisture, %	8.3	60.0	20.5
Crude protein, %	7.4	15.8	11.7
Crude fiber, %	28.1	70.0	41.2
TDN[b], %	16.4	62.2	46.6
Ash, %	4.0	20.6	11.1
Phosphorus,	0.12	0.36	0.20
Potassium, %	0.80	2.29	1.45
Calcium, %	0.49	1.60	0.90
Magnesium	0.16	0.32	0.20
Sodium	0.03	0.31	0.12

[a]Summary of 35 samples; from Steward et al., 1998.
[b]Total digestible nutrients.