

COTTON GIN BY-PRODUCTS: AN ECONOMICAL FEED RESOURCE FOR RUMINANT LIVESTOCK

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Introduction

Livestock farming plays a crucial role in the livelihood of rural farmers in India. However, the shortage of quality fodder and increasing feed costs remain major constraints affecting livestock productivity. To overcome these challenges, the use of agro-industrial by-product as alternative feed resources has gained importance. Among these, cotton processing residues such as cotton gin trash (CGT) have emerged as a promising and economical feed resource for ruminant animals including cattle, sheep, and goats. Cotton gin trash is generated during the ginning process where cotton lint is separated from the seeds. The by-products mainly consists of cotton burs, leaves, stems, immature lint, and small quantities of dust and soil particles. Instead of being treated as waste, this material can be effectively utilized as a livestock feed ingredient when incorporated properly in ruminant diets.

Cotton By-products Used in Animal Feeding

Cotton processing produces several by-product's that are widely used in livestock feeding systems.

- **Whole cottonseed** is a highly nutritious feed ingredient containing protein, fat, and fibre. It is commonly included in dairy and beef cattle rations because it provides both energy and effective fiber.
- **Cotton gin trash (CGT)** mainly acts as a fibrous roughage source. It is particularly

- useful during periods of fodder scarcity and can partially replace conventional dry fodder in ruminant diets.
- **Cottonseed hulls** are the outer coverings of cottonseed and serve as a palatable source of fiber that helps maintain rumen function.
- **Cottonseed meal**, the residue obtained after oil extraction from cottonseed, is a protein-rich feed ingredient widely used in concentrate mixtures for livestock.

Nutritional Characteristics

Cotton gin trash contains moderate levels of crude protein (6–10%) and a high proportion of crude fibre (35–50%), making it suitable mainly as a roughage source in ruminant feeding systems. The nutritional composition of CGT varies depending on cotton variety, harvesting method, and contamination with soil or plant residues. Research studies have indicated that cotton gin by-products can serve as an economical alternative roughage source when included at appropriate levels in the diet. Studies conducted on sheep feeding systems have shown that CGT can partially replace traditional fodder without negatively affecting feed intake or animal performance (Balaji *et al.*, 2023). CGT can be stored in loose or baled form, making it easy to transport and handle. However, proper drying and storage conditions are essential to prevent spoilage and mold development.

Table 1. Approximate Nutrient Composition of Major Cotton By-products Used in Livestock Feeding

Feed ingredient	Crude Protein (%)	Crude Fiber (%)	Ether Extract (%)	Total Digestible Nutrients (TDN %)
Whole cottonseed	22–24	20–25	18–20	85–90

Cottonseed meal	40–45	10–14	1–2	65–70
Cottonseed hulls	3–5	40–45	1–2	40–45
Cotton gin trash	6–10	35–50	1–3	40–50

Values are approximate and may vary depending on processing methods and contamination levels.

Palatability and Feeding Practices

Cotton gin trash may have lower palatability when offered alone, which can reduce voluntary feed intake. To overcome this limitation, farmers often mix CGT with other feed ingredients such as molasses, cereal grains, or concentrate mixtures to improve palatability and nutritional value. Research has shown that incorporating cotton gin trash in sheep diets during feed scarcity periods can help reduce feed costs while maintaining acceptable animal performance (Balaji *et al.*, 2023; Dias *et al.*, 2020).

Feeding Recommendations and Safety Considerations

Although cotton gin trash can be used as a roughage source, its inclusion level should be carefully managed. It is generally recommended that CGT should not exceed 15–20% of the animal's daily dry matter intake (DMI).

Cotton by-products' also contain gossypol, a naturally occurring compound that can be toxic when consumed in excessive amounts. Therefore, proper monitoring of cotton by products used in livestock diets is important. In addition, improper storage conditions may lead to mold growth and aflatoxin contamination, which can adversely affect animal health (Smith *et al.*, 2022).

Cotton gin trash is particularly suitable for maintenance feeding of dry or pregnant beef cattle and small ruminants such as sheep and goats. However, it is less suitable for high-producing dairy animals that require diets rich in digestible energy.

Recent studies have also evaluated the safety of cotton gin trash used by sheep farmers and reported that proper handling and

feeding management can make it a safe alternative roughage resource (Balaji *et al.*, 2024).

Economic Benefits for Farmers

Utilization of cotton gin by-products offers a dual advantage. It reduces feed costs for farmers and promotes the efficient use of agricultural residues that might otherwise go to waste. In cotton-growing regions, CGT is often available at low cost or even free of cost, making it an attractive option for resource-poor farmers.

Studies have demonstrated that feeding cotton gin by products can improve the economic efficiency of livestock production systems, particularly in sheep and beef cattle enterprises where feed costs constitute a major portion of total production expenses (Dias *et al.*, 2020; Ponce *et al.*, 2020).

Practical Feeding Model for Sheep/Goats Using Cotton Gin Trash

Cotton gin trash (CGT) can be effectively used as a partial roughage substitute in sheep and goat feeding systems, particularly in cotton-growing regions where it is easily available. However, it should always be combined with other feed ingredients to ensure a balanced nutrient supply. The inclusion level should generally not exceed 15–20% of total dry matter intake (DMI). A practical feeding model for small ruminants is presented below, which can be adopted by farmers during periods of fodder scarcity.

Table 2: Example Ration for Growing Sheep/Goats Using Cotton Gin Trash

Feed ingredient	Quantity (g/day/animal)	Purpose
Cotton gin trash	200–300	Roughage source, provides fiber
Dry fodder (sorghum straw / groundnut haulm)	300–400	Basal roughage
Green fodder (COFS / hedge lucerne / grasses)	300–500	Vitamins and minerals
Concentrate mixture	200–250	Protein and energy source
Molasses (optional)	20–30	Improves palatability
Mineral mixture + salt	5–10	Mineral supplementation

Table 3: Suggested Concentrate Mixture Composition

Ingredient	Percentage (%)
Maize / sorghum grain	35
Wheat bran / rice bran	30
Cottonseed meal / groundnut cake	25
Mineral mixture	2
Common salt	1
Molasses	7

Feeding Tips for Farmers

- Introduce cotton gin trash gradually in the ration to allow animals to adapt.
- Always mix CGT with other fodders or concentrates to improve palatability.
- Avoid feeding moldy or contaminated CGT.
- Provide clean drinking water at all times.

References

Balaji NS, Ramakrishnan S, Muralidharan J, Vasan P, Thiruvankadan AK and Sivakumar K. 2023. Effect of cotton gin trash supplementation as an unconventional feedstuff

- Monitor animals for any digestive disturbances when new feeds are introduced.

Expected Benefits

- Reduces dependence on expensive dry fodder
- Utilizes locally available agro-industrial by products
- Helps maintain animal body weight during fodder scarcity

Improves overall economic efficiency of sheep and goat farming

Key Messages for Farmers

- Cotton gin trash is an economical alternative roughage source for cattle, sheep and goats.
- It contains moderate protein and high fiber, making it suitable for maintenance feeding of ruminants.
- CGT should be included up to 15–20% of total dry matter intake in livestock diets.
- Mixing CGT with molasses or concentrate feed improves palatability and intake.
- Proper storage is essential to avoid mould and toxin contamination.
- Utilization of cotton by-products helps reduce feed costs and improves farm profitability.

Conclusion

Cotton gin by-products represent a valuable and underutilized feed resource for ruminant livestock. When used judiciously and combined with other feed ingredients, cotton gin trash can help alleviate fodder shortages and reduce feeding costs. Promoting the scientific utilization of such agro-industrial residues will contribute to sustainable and economical livestock production, especially in cotton-growing regions of India.

- on feed intake and production characteristics of Mecheri sheep. *Sustainability* 15(13): 10500.
- Balaji NS, Ramakrishnan S, Muralidharan J, Prakash Singh DA and Sankar V. 2024. Evaluation of toxic residues in cotton gin trash used as a roughage supplement by sheep farmers in Tamil Nadu. *International Journal of Veterinary Science and Animal Husbandry* 9(6): 627–628.
- Balaji NS, Ramakrishnan S, Muralidharan J, Vasani P, Kumaravel V and Thirunavukkarasu D. 2023. Cotton gin trash feeding amid feed scarcity in sheep and factors driving its inclusion in Tamil Nadu, India. *Agriculture* 13(8): 1552.
- Dias NW, Braga AP, Figueiredo M and colleagues. 2020. Chemical and biological treatment of cotton gin trash for fattening lambs and its effects on digestibility and growth performance. *Livestock Science* 240: 104146.
- Ponce CH, Brown MS and colleagues. 2020. Evaluation of ruminal degradability and metabolism of diets containing cotton by-products' in cattle. *Journal of Animal Science* 98(9): skaa257.
- Smith ZK, Johnson BJ and colleagues. 2022. Cotton gin by product: Effects on feed intake, quality and safety for use in diets of gestating beef cows. *Applied Animal Science* 38(5): 402–408.

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