

Effect of High-Dose Galactomannan Supplementation on Milk Yield, Milk Composition, and Farm Revenue in Indigenous Lactating Cows and Buffaloes: A Multi-Farm Field Study

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Abstract

Background: Optimizing rumen fermentation improves milk yield and milk fat. Fermentable fiber supplementation may enhance microbial efficiency in ruminants.

Objective: To evaluate high-dose galactomannan supplementation on milk yield, milk composition, digestive health, and farm revenue in indigenous lactating cows and buffaloes.

Methods: A multi-farm field study across three farms included 20 animals (10 indigenous lactating cows and 10 lactating buffaloes). Non-indigenous high-yielding breeds were not included. Each animal received 25 grams twice daily (total 50 g/day) of a supplement composed of one-third soluble fiber, one-third insoluble fiber, and one-third protein.

Results: Milk fat increased from 6.0% to 8.6%. Milk solids excluding fat increased from 7.5% to 9.2%. Milk yield increased from 4 L to 5.5 L per milking session. Feed intake increased by approximately 20%. Water intake increased by 50–60%. Dung became well formed with no diarrhea observed. Animals demonstrated improved musculature and body tone. Improved milk production and dung quality contributed to enhanced revenue potential.

Introduction

Rumen microbial fermentation plays a fundamental role in dairy productivity. Efficient fermentation improves volatile fatty acid production, influencing milk fat synthesis and overall milk composition. Galactomannan is a fermentable polysaccharide that may enhance microbial growth in the rumen. This study evaluated productive, digestive, and economic outcomes under practical farm conditions.

Materials and Methods

Study Design: Multi-farm observational field study.

Study Population:

- Total animals: 20
- 10 indigenous lactating cows
- 10 lactating buffaloes

Only indigenous cow breeds were included.

Supplementation Protocol:

- 25 grams twice daily
- Total daily dose: 50 grams per animal
- Composition: 1/3 soluble fiber, 1/3 insoluble fiber, 1/3 protein

Outcome Measures:

- Milk yield
- Milk fat percentage
- Milk solids excluding fat
- Feed intake
- Water intake
- Urine output
- Dung formation
- Physical condition

Results

Consistent improvements were observed across farms in milk composition, yield, feed intake, hydration, digestive parameters, and overall animal condition. No adverse gastrointestinal effects were reported.

Economic Implications

Enhanced milk output increased daily milk sales. Improved dung quality enabled additional revenue streams through organic manure use, vermicomposting, biogas production, and dried dung fuel products. Both milk and manure improvements strengthened farm economics.

Conclusion

High-dose galactomannan supplementation (50 g/day) in indigenous lactating cows and buffaloes across three farms was associated with significant improvement in milk fat percentage, increased milk solids excluding fat, increased milk yield, enhanced feed consumption and hydration, improved digestive health, and improved physical condition.

The findings indicate improved rumen efficiency and enhanced nutrient utilization under practical farm conditions, along with positive economic impact through increased milk output and improved manure utilization.