



Fodder Beet (*Beta vulgaris*): The Winter Energy Powerhouse Transforming Livestock Farming

Sunita Lanje and *Hrishikesh Tekade

Animal Nutrition Division, Indian Veterinary Research Institute, Izatnagar, UP, India

*Corresponding Author's email: hrishikeshtekade2000@gmail.com

Seasonal green fodder scarcity especially between January and April presents a major hurdle for livestock farmers operating in arid and semi-arid regions. Fodder beet (*Beta vulgaris*) has rapidly emerged as an extraordinary solution, capable of yielding over 200 tonnes of fresh biomass per hectare in just four months at a remarkably low cost (< ₹0.50 per kg). Featuring high metabolic energy (12–13 MJ ME/kg DM) and rich water-soluble carbohydrates (55–70% of DM), fodder beet acts as a highly digestible forage concentrate. Beyond boosting milk production by 8–10% in dairy cattle, its low crude protein content (< 7%) helps reduce environmental nitrogen excretion. However, careful feeding protocols including a mandatory 10-15 day dietary adaptation phase are essential to prevent metabolic issues like acidosis and oxalate toxicity. This article outlines the agronomic steps, nutritional strengths, and practical feeding guidelines for integrating fodder beet into modern livestock farms.

Keywords: Fodder beet; Metabolisable energy; Rumen acidosis; Nitrogen use efficiency

Introduction

Ask any dairy farmer about their biggest operational headache, and chances are they will mention feed costs and fodder shortages. During the lean winter and early spring months (January through April), getting a steady supply of lush, green forage is often tough and expensive (ICAR, 2021). Poor soil quality and saline irrigation water only make matters worse for farmers in dry regions. Long prized in countries like Denmark and the Netherlands, fodder beet which is energy-dense root crop is taking root across livestock farms in India and other developing agrarian markets. Producing upwards of 200 tonnes of green biomass per hectare within just 120 days, fodder beet offers an exceptionally high water-use efficiency of 28–32 kg biomass per cubic meter of water. Functioning essentially as a "forage concentrate," it fills the critical winter feeding gap while keeping production costs down to under 50 paisa per kilogram of green fodder.

Description: Cultivation, Nutrition, and Feeding Protocols

Popular Cultivars

Choosing the right variety is key to getting high yields and ensuring disease resistance:

- **JK Kuber:** A popular orange-colored variety famous for its high biomass yields, energy density, and superior digestibility.
- **Jomon:** An orange-colored beet known for its strong resistance to leaf diseases and early bolting.
- **Monroe:** A red-colored variety with exceptional resistance to bolting.
- **Geronimo:** A robust yellow-orange variety featuring high tolerance to fungal threats like powdery mildew.

Agronomic Guidelines

Fodder beet is a cool-season winter crop that adapts surprisingly well to marginal soils and poor-quality irrigation water (FAO, 2018).

- **Sowing Window:** Mid-October to mid-November. Early planting gives the root systems enough time to establish before peak winter sets in.
- **Land Preparation:** Deeply plough the field 3 to 4 weeks prior to sowing to create a fine, loose seedbed. Forming ridges approximately 20 cm high is strongly recommended to boost root enlargement and avoid waterlogging.
- **Seed Rate & Spacing:** Use 2.0 to 2.5 kg of seed per hectare. Plant seeds at a depth of 2 to 4 cm, maintaining 20 cm spacing between individual plants.
- **Fertilization:** Apply 25 tonnes of Farmyard Manure (FYM) alongside 100 kg Nitrogen (N) and 75 kg Phosphorus (P) per hectare. Split the Nitrogen application into three doses: 50% at sowing, 25% at 30 days, and the remaining 25% at 50 days post-sowing.
- **Irrigation & Crop Care:** The crop needs about 10 to 12 sprinkler irrigations (totaling 80–100 cm of water) applied every 7 to 10 days. Perform thinning, weeding, and earthing-up between 20 and 30 days after sowing. To tackle soil-borne pests, treat the soil with Quinalphos 1.5% dust @ 25 kg/ha before sowing.

Nutritional Profile

Fodder beet is unique because it blends the bulk of a forage crop with the energy density of a feed grain:

- **Dry Matter (DM):** 14% to 22%.
- **Metabolisable Energy (ME):** High energy density of 12–13 MJ ME/kg DM.
- **Soluble Sugars:** Loaded with water-soluble carbohydrates (55–70% of DM, mostly sucrose), making it sweet and extremely palatable to animals.
- **Digestibility:** High organic matter digestibility of 70–80%.
- **Crude Protein (CP):** Contains less than 7–8% CP. While low in protein, this lower level actually helps reduce urinary nitrogen losses, lowering environmental pollution (Matthew et al., 2019).

Feeding Protocols and Performance

Harvesting starts in mid-January once individual roots reach 1.0 to 1.5 kg.

Harvesting (Mid-Jan) → Chop Roots Fresh → Mix with Dry Roughage (Straw/Hay)



Feed Livestock Daily:

- Cows/Bufaloes: 12-20 kg/day
- Sheep/Goats: 4-6 kg/day

- **Recommended Rates:** Feed 12 to 20 kg/day for dairy cows and buffaloes, and 4 to 6 kg/day for small ruminants (sheep and goats).
- **Dairy Performance:** Feeding trials show that adding fodder beet to the diet can boost milk yields in Tharparkar cattle by 8–10%. Moreover, lactating cows show higher overall milk solids, fat, and protein yields compared to those fed brassicas like kale (Matthew et al., 2019).

Risk Management & Antinutritional Factors

Despite its rich energy content, fodder beet must be introduced carefully:

1. **Rumen Acidosis:** Because the sugar content ferments rapidly in the rumen, feeding fodder beet in excess (> 80% of total dry matter intake) can trigger severe acidosis.
2. **Oxalate Toxicity:** The leafy green shoots contain high oxalate levels. Excessive shoot consumption can bind blood calcium, causing insoluble calcium oxalate formation and triggering milk fever-like symptoms.
3. **Spoilage:** Roots left lying around for more than three days post-harvest spoil quickly and can cause stomach upsets.

Mitigation Steps:

- **Transition Phase:** Always use a 10- 15 day step-up adaptation period, gradually increasing fodder beet up to a maximum of 60% of the animal's total dry matter intake (DMI).

- **Dietary Limits:** Limit fodder beet to total DMI for lactating cows and for dry cows (a mix of 65% fodder beet and 35% pasture silage works great for dry cows).
- **Freshness:** Only feed freshly chopped roots within 3 days of harvesting.

Conclusion

Fodder beet (*Beta vulgaris*) is a game-changing option for livestock producers looking for a reliable, energy-packed forage during lean winter months. Its ability to produce massive biomass under poor soil and water conditions makes it both cost-effective and environmentally friendly. By using smart crop management and sticking to safe, gradual feeding transition protocols, dairy farmers can boost milk production, improve milk quality, and lower feed bills.

References

1. FAO. (2018). *Fodder Beet: Production and Utilization for Livestock Feed in Water-Scarce Regions*. Food and Agriculture Organization of the United Nations, Rome.
2. ICAR. (2021). *Handbook of Fodder Crops and Animal Nutrition*. Indian Council of Agricultural Research, New Delhi.
3. Matthew, C., Dairy, J., & Crop Science Group. (2019). *Fodder beet allocation and dietary adaptation strategies in wintering dairy cattle*. New Zealand Journal of Agricultural Research, 62(3), 310–325.