



Azolla: A Promising Green Fodder for Sustainable Livestock Nutrition

Dr. Arun Kumar¹, Dr. Sita Ram Gupta¹, Dr. Divakar Chaudhary² and Dr. Ashok Choudhary³

Introduction:

Azolla, a small aquatic fern, has gained significant attention in recent years as a sustainable and nutritious green fodder option for livestock and it forms a symbiotic relationship with the nitrogen-fixing cyanobacteria *Anabaena azollae*. This unique partnership allows Azolla to grow rapidly and accumulate high levels of protein, making it an excellent candidate for use as animal feed [1].

Nutritional Value

Azolla is recognized for its high nutritional content, particularly its protein levels. Studies have shown that Azolla contains approximately 25-35% protein on a dry weight basis, along with essential amino acids, vitamins (vitamin A, vitamin B12, and Beta-Carotene), growth promoter intermediaries, and minerals [2]. This rich nutritional profile makes Azolla a valuable supplement in animal diets, particularly for ruminants, poultry, and fish.

Benefits in Livestock Nutrition

1. Dairy Cattle: Supplementing cattle feed with Azolla has been shown to increase milk production and improve milk

quality. A study by Kathirvelan et al. (2015) reported a 15% increase in milk yield when Azolla was included in the diet of dairy cows [3].

2. Poultry: Azolla can partially replace commercial feed in poultry diets, reducing feed costs without compromising growth or egg production. Research has demonstrated that incorporating up to 5% Azolla in layer diets can improve egg quality and reduce feed costs [4].

3. Aquaculture: In fish farming, Azolla serves as an excellent feed for herbivorous and omnivorous fish species. It has been shown to enhance growth rates and improve the overall health of farmed fish.

Cultivation and Production

Azolla's rapid growth rate - it can double its biomass in 3-5 days under optimal conditions - makes it an attractive option for farmers [5]. It can be easily cultivated in shallow ponds or tanks, requiring minimal inputs and maintenance. This ease of production contributes to its potential as a

Dr. Arun Kumar¹, Dr. Sita Ram Gupta¹, Dr. Divakar Chaudhary² and Dr. Ashok Choudhary³

¹Livestock Research Station Beechwal, RAJUVAS Bikaner -334001

²Engineering and Technology Centre for Animal Science, RAJUVAS Bikaner-334001

³Krishi Vigyan Kendra Nohar, Hanumangarh - 335063

sustainable feed source.

Environmental Benefits

Beyond its nutritional value, Azolla cultivation offers several environmental benefits:

1. **Carbon Sequestration:** Azolla is known for its ability to rapidly absorb atmospheric carbon dioxide, contributing to carbon sequestration efforts.
2. **Bioremediation:** It can be used to remove excess nutrients from water bodies, helping to mitigate eutrophication in aquatic ecosystems.
3. **Reduced Methane Emissions:** When used as a feed supplement for ruminants, Azolla has been shown to potentially reduce methane emissions from livestock.

Challenges and Future Prospects

While Azolla shows great promise as a green fodder, challenges remain in scaling up production and integrating it into mainstream farming practices. Future research should focus on optimizing cultivation techniques, assessing long-term effects on animal health, and developing efficient harvesting and processing methods.

Conclusion

Azolla represents a promising alternative in the quest for sustainable and nutritious animal feed. Its high protein content,

rapid growth rate, and environmental benefits make it an attractive option for farmers looking to improve livestock nutrition while reducing their environmental footprint. As research continues and cultivation practices improve, Azolla is likely to play an increasingly important role in sustainable agriculture and livestock production.

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