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EXPLORING SOYBEAN POTENTIAL AS AN ALTERNATE FODDER CROP IN INDIA

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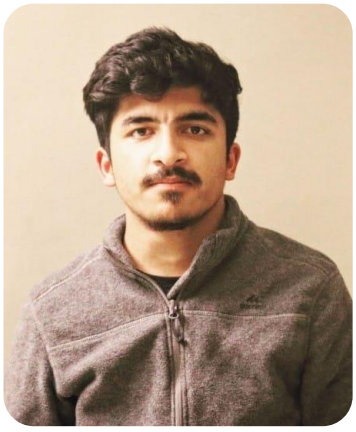
ABSTRACT

This exploration delves into the potential of soybean as an alternative fodder crop in India, shedding light on its nutritional richness, palatability, and suitability for year-round green fodder. Despite soybean's global significance, its underutilization as fodder in India poses challenges, including the absence of dedicated varieties and health concerns. Solutions involve research for specialized varieties, farmer education, market development, and addressing health issues. Opportunities for researchers, farmers, and professionals abound, paving the way for sustainable livestock nutrition and enhanced agricultural landscapes in India.



INTRODUCTION

Soybean, renowned for its status as a cost-effective protein source, played a pivotal role in the 2020-21 market year, contributing 70.86% to global plant-based protein meal supply and 28.88% to plant-based oil (Market View Data Base, United Soybean Board 2021). Despite its global cultivation, Brazil, the USA, and Argentina collectively account for 80% of soybean production. Recognized for its high protein content and nutritional value, soybean is consumed worldwide. The World Agricultural Supply and Demand Estimates (WASDE) report forecasts a global soybean production of 369.6 million metric tons in the 2022–2023 crop year (Soybean Focus Report 2023). Apart from its primary use as a grain crop, soybean is cultivated for fodder in countries like the USA, yielding 5-10 tons of dry matter within 3-4 months. Furthermore, soybean contributes to sustainable agriculture by fixing 137 kg/ha of nitrogen in a single growing season (Ciampitti & Salvagiotti 2018).

INDIAN PERSPECTIVE

Livestock plays a crucial role in India's agricultural economy, contributing 6.2% to the total national Gross Value Added (National Accounts Statistics-2022). While India has been a global leader in milk production over the past 25 years, animal productivity remains below the global average. The primary impediment to higher productivity is the scarcity of quality feed and fodder. Cultivating high-quality fodder

not only fosters employment, income, and rural development but also delivers environmental benefits such as soil conservation and improved water efficiency. Green fodder, a significant source of protein in animal diets, plays a pivotal role in providing essential nutrients for livestock. Against this backdrop, soybean emerges as a potential alternative to traditional fodder crops, offering year-round green fodder during crucial months like September, October, and November. Despite soybean's predominant cultivation for grains in India, overlooking its potential as a fodder crop, it presents a promising solution. However, the absence of dedicated fodder varieties, health concerns, convincing farmers to adopt soybean as fodder, market challenges, and pesticide residues pose significant challenges.

NUTRITIVE VALUE

Soybean fodder stands out for its palatability and nutritional richness, boasting digestibility levels of up to 70%. The protein content in soybean fodder ranges from 11-22% of Dry Matter (DM), depending on the harvest stage. The lignin content is modest, constituting only 6% of DM, while the Acid Detergent Fiber (ADF) content varies from 20% to 45% of DM. Cattle exhibit a 70% increase in grazing time when offered soybean fodder compared to cowpea and lablab fodder (Horadagoda et al., 2009), emphasizing its palatability and appeal. In addition to its protein content, soybean fodder is rich in essential amino acids and vitamins, enhancing its overall nutritional value as livestock feed.

(Image by Julio César García from Pixabay)

CHALLENGES AND SOLUTIONS

1. Lack of Dedicated Fodder Varieties: India faces a notable scarcity of soybean varieties specifically bred for fodder, hindering its optimal use. Addressing this requires extensive research and development to breed dedicated soybean varieties with higher protein content, enhanced digestibility, and reduced anti-nutritional factors.

2. Health Concerns: Excessive feeding of soybean fodder can cause bloating in ruminants (Krantz, 2012). Anti-nutritional factors like phytoestrogens and trypsin-inhibitors can lead to reproductive problems and reduced protein digestion. Ongoing research is necessary to develop soybean varieties with reduced levels of these factors.

3. Convincing Farmers to Cultivate Soybean as Fodder: Comprehensive education programs, workshops, seminars, and practical demonstrations are needed to illustrate the economic advantages of soybean as fodder, emphasizing increased livestock productivity potential.

4. Absence of Proper Market for Fodder Soybean: This issue, affecting all fodder crops, can be addressed through technological innovations, public-private partnerships, government policies, and insurances to ensure stable markets, improving livestock health, farmer income, and food security.

5. Pesticide Residues: Lesser pesticide use can mitigate the threat of pesticide residues in fodder, safeguarding animal health and productivity.

FUTURE OPPORTUNITIES

Numerous opportunities exist for researchers, farmers, and agricultural professionals in India to harness the full potential of soybean. Breeders can develop fodder soybean varieties suitable for diverse Indian ecosystems, while agronomists optimize crop management practices for higher yields and quality. Entomologists contribute by devising effective pest management strategies, and agricultural extension officers play a crucial role in disseminating knowledge and best practices to farmers. This collaborative effort not only boosts the fodder soybean industry but also strengthens India's overall agricultural landscape.

CONCLUSION

Harnessing soybean's potential as a fodder crop in India holds promise for mitigating the protein deficit in livestock nutrition. With its comparable yields to maize and superior protein content, soybean stands as a viable solution to address both quantity and quality concerns in animal feed. Overcoming challenges through targeted research, education, and market development will not only boost the fodder soybean industry but also contribute to sustainable and nutritious livestock feeding practices, thereby strengthening India's agricultural landscape

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