UNLOCKING THE MICROBIAL AND ECONOMIC POTENTIAL OF MIZORAM'S DAIRY SECTOR: A SCIENTIFIC PERSPECTIVE

[1]M. Gowtham and [2]D. Deka

[1]PhD scholar, Division of Veterinary Public Health, ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly, UP-243122

[2]Associate Professor, Department of Veterinary Public Health and Epidemiology, Central Agricultural University, Selesih, Aizawl, Mizoram 796 015 India

Corresponding author email: gowtham.vet1518@gmail.com

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ABSTRACT

Mizoram, a meat-eating state in India's northeast, has traditionally paid limited attention to the dairy sector. However, rising demand for milk and milk products, coupled with nutritional needs, has prompted a renewed focus on dairy development. Despite its growing urban and semi-urban dairy activity, Mizoram faces a critical milk production shortfall and heavily relies on imports. This study combines microbiological research on lactic acid bacteria (LAB) isolated from local dairy sources with a broader economic and developmental assessment of the dairy sector. The identification of probiotic strains holds promise for both animal and human health, while the evolving dairy infrastructure provides a framework for future sustainability. The study underscores the potential of integrating microbiological insights with agricultural policy to enhance dairy productivity, food security, and public health in the region.

KEYWORDS: Lactic Acid Bacteria, Probiotics, Northeast, Mizoram

INTRODUCTION

India's livestock sector plays a critical role in supporting rural livelihoods, income generation, and food security. It contributes 2.07% to the total GDP and 10.63% of the agricultural GDP in the North Eastern Region (NER) of India, compared to the national averages of 4.11% and 25.6%, respectively. Mizoram, with a predominantly meat-eating population, has historically prioritized livestock for meat over dairy production. However, the emerging nutritional challenges and increasing urban demand for dairy products necessitate a strategic focus on milk production.

In this context, the exploration of probiotic bacteria in local milk products offers dual benefits, enhancing the quality of dairy products and contributing to public health. The present study explores the lactic acid bacteria (LAB) present in dairy cattle sources in Mizoram while situating this microbiological research within the broader socio-economic and developmental framework of the state's dairy industry.

LIVESTOCK DEMOGRAPHICS AND DAIRY ECONOMY IN MIZORAM

According to the 20th Livestock Census (2019), the total livestock population in the NE region was 24.3 million, accounting for 4.5% of India's livestock. In Mizoram, cattle constitute 54.84% of the livestock, followed by goats (~22%) and pigs (~17%). Mithun and Yak are unique to this region, contributing to socio-cultural identity and food diversity. Mithun is especially important in Arunachal Pradesh (30.1%), Nagaland (4.18%), and Manipur (1.65%).

Despite having livestock assets, Mizoram's milk production is inadequate. The average per capita milk availability is well below the Indian Council of Medical Research (ICMR) recommendations. Milk production is not self-sustaining, and the state heavily depends on imports from neighboring states to meet domestic demand. Although crossbred cattle have become the main dairy animals in Mizoram, indigenous species like Mithun (1–2.5 kg/day) and Yak (1.3±0.6 kg/day) contribute marginally to milk

output. Despite these limitations, efforts are being made to increase dairy activities in urban and semi-urban areas.

MICROBIAL RESEARCH ON DAIRY BACTERIA IN MIZORAM

A crucial component of dairy product quality and safety is its microbial content. At the College of Veterinary Sciences and Animal Husbandry in Aizawl, Mizoram, scientists M. Gowtham and D. Deka carried out a detailed investigation to uncover beneficial bacterial strains from milk, fermented milk, and cow dung. The research focused on isolating and characterizing Lactic Acid Bacteria (LAB), known for their role in fermentation and probiotic effects.

Using MRS (de Man, Rogosa, and Sharpe) media and modern DNA techniques like PCR, 42 LAB-positive samples were identified out of 250. These included Lactobacillus plantarum, L. fermentum, L. brevis, Bacillus coagulans, Enterococcus faecium, and Weissella cibaria. These bacteria are not only vital for fermentation but also hold immense probiotic value for gut health and immunity.

ANTIBIOTIC RESISTANCE ANALYSIS

Ensuring that LAB strains are safe for consumption includes screening them for antibiotic resistance. The selected isolates were tested against a panel of antibiotics. Most strains were found to be sensitive, reducing concerns about spreading resistance. However, moderate resistance to kanamycin, penicillin, and clindamycin was observed in some strains. This indicates the need for monitoring and safety validation before commercial use.

DAIRY SECTOR CHALLENGES IN MIZORAM

Mizoram's dairy sector is underdeveloped. Key challenges include:

- A substantial milk production shortfall.
- Heavy reliance on imports to meet local demand.
- Only a small percentage of total milk is procured by cooperatives.
- Direct farmer-to-consumer milk sales dominate the market.

Despite these challenges, several positive trends are emerging:

- Increasing urban dairy farming activities.
- Operational milk chilling and processing units in select districts.
- Dairy development and breeding farms are being supported.
- The Mizoram Milk Cooperative Union (MULCO) is being strengthened to improve production, marketing, and branding.

SIGNIFICANCE OF THE STUDY

This research demonstrates how microbiological analysis can guide and enhance dairy development strategies. The isolation of LAB offers pathways to local probiotic development, which can enhance milk quality, support livestock health, and contribute to human nutrition. Understanding the microbial landscape adds value to dairy science, while the economic insights provide a roadmap for self-sufficiency in milk production. Combining microbiological science with agricultural policy and market infrastructure could bridge the milk demand-supply gap, reduce reliance on imports, and support local livelihoods. Furthermore, probiotic use could reduce antibiotic dependency in livestock, addressing broader health concerns.

CONCLUSION

Mizoram's dairy sector, while facing significant challenges, also holds untapped potential. The integration of scientific microbiological research with proactive policy and infrastructure development could make dairy farming more viable and sustainable in the region. Unlocking the microbial potential of local dairy products aligns with global trends in probiotic research and offers localized solutions to nutritional and economic challenges.

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