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Isolation and Characterization of Lactic Acid Bacteria from Rumen Samples

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Structured Abstract

Background: Lactic acid bacteria (LAB) are a diverse group of bacteria known for their ability to produce lactic acid and play a major role in variety of fermentation processes. These bacteria are essential in numerous industries, including food, dairy, and pharmaceuticals, due to their beneficial properties. However, relying on the same cultures can lead to exhaustion and possible lead to gene mutation. Therefore, there is a pressing need for new LAB strain with advantageous characteristics to meet the evolving demands of these industries.

Methods: This study aims to isolate LAB from rumen samples and identify them through a comprehensive approach, including morphological, biochemical and molecular methods. The isolation process began with collecting rumen samples from a local slaughterhouse, transporting them in a sterile saline solution, and storing them at 4˚C until further analysis. Morphological identification involved macroscopic and microscopic observations to assess colony and cell characteristics. Biochemical test, such as catalase test were conducted, to determine the metabolic properties of the isolates. The analysis followed by molecular identification using PCR and 16S rRNA gene sequence analysis.

Results: This study successfully isolated five potential LAB strains from rumen samples, two of which were identified as *Enterococcus faecalis.* The rumen samples exhibited a higher population of fermentative LAB than non-fermentative LAB. However, the selected LAB isolates did not show antimicrobial properties against the tester strains, *Escherichia coli* and *Pseudomonas aeruginosa* due to various factors.

Conclusion: In conclusion, this study successfully isolated and characterized LAB strains from a novel niche, revealing their significant biotechnological potential. Although antimicrobial properties were not observed in selected isolates, the findings suggest that these LAB strains could be further explored and optimized. Therefore, further analysis with careful parameters is recommended on these isolated LAB varying pH levels, temperature, and nutrient compositions on LAB activity to ensure their safety and efficacy for use in developing new probiotic products and bioprocessing techniques.

Keywords: Lactic Acid Bacteria (LAB), Rumen Samples, Isolation and Characterization, Antimicrobial Properties, *Enterococcus faecalis.*

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