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Antimicrobial and Antioxidant Activities of Equine Milk Lactoferrin: Application Prospects

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ABSTRACT

Lactoferrin (LF) is a multifunctional iron-binding glycoprotein found in mammalian milk, including Equine milk, where its concentration is higher than in cow's milk. Due to its unique amino acid sequence and ability to bind divalent ions, LF exhibits a wide range of biological properties, including antioxidant and antimicrobial activities. The antioxidant effect mainly results from chelating iron and copper ions, which stops the formation of highly reactive hydroxyl radicals. Antibiotic resistance is a critical global health issue, creating an urgent need for new antimicrobial agents to combat resistant microorganisms. LF represents a promising alternative in the fight against bacterial infections. This study evaluates the antioxidant and antimicrobial activities of LF extracted from equine milk, exploring its potential in food products and as a preventive agent. LF was isolated from Equine milk serum using ion-exchange chromatography. The antimicrobial activity of LF was tested *E. coli*, *S. aureus*, and *P. aeruginosa* microbial strains based on their clinical relevance, diverse resistance mechanisms, and differences in cell wall structure, allowing for a comprehensive evaluation of LF's potential as an antimicrobial agent. LF created clear growth inhibition zones of 24 mm and 25 mm against the tested microorganisms. The results indicated that LF has significant antioxidant properties, measuring 48.535 μ M Trolox equivalents per milligram of protein, reflecting a moderate antiradical effect. Its reducing power was also confirmed, with a relative activity of 2.9 compared to ascorbic acid, meaning that equine LF is almost three times more effective than ascorbic acid in reducing iron at equimolar concentrations. Equine milk LF is a biologically active component with significant potential in functional nutrition, pharmaceuticals, and nutraceuticals. Its antioxidant and antimicrobial properties position it as a key area of research for developing products aimed at promoting health and preventing diseases related to infections and oxidative stress.

Keywords: Lactoferrin, Equine Milk, Antimicrobial activity, Antioxidant activity