

## **A Study of Immunoregulatory Mechanism of Exopolysaccharide Producing Immunobiotics to Develop Novel Immunobiotics**

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Over the past decade, the use of probiotics as feed supplements in animal production has increased considerably, due to the ban on antibiotic growth promoters. Various chemical and physical properties of Lactobacillus EPS, such as the structural, rheological, and shelf-life enhancement of different food products, are mentioned. Moreover, EPSs play a characteristic role in starter culture techniques, yogurt production, immunomodulation, and potential prebiotics.

An exopolysaccharide, designated as MM89-EPS, was isolated from *Lactiplantibacillus plantarum* MM89. It was comprised of glucose and mannose molecules with an average molecular weight of 138 kDa. FTIR and NMR spectra showed that MM89-EPS had characteristic polysaccharide functional groups. MM89-EPS displayed excellent water solubility and capacities to retain water and oil due to its porous structure. MM89-EPS exhibited no significant cytotoxicity on RAW264.7 cells and showed strong immunomodulatory activity by increasing phagocytosis, acid phosphatase activity, and cytokine production in RAW264.7 cells. Furthermore, an in vivo study revealed that splenic indices, intestinal IgA levels, serum cytokine levels, and lymphocyte proliferation were increased in an MM89-EPS-treated cyclophosphamide-induced immunosuppressed mouse model.

To summarize, our results indicate that MM89-EPS can efficiently enhance the immunostimulatory activity of immune cells and an immunosuppressed mouse model. Hence, MM89-EPS may be used as a potential source of immunomodulatory agent in various food products.

**Keywords:** *Lactiplantibacillus*; breast milk; exopolysaccharide; immunomodulatory activity; techno-functional properties