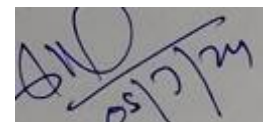# Summary of the research work

The presented work will provide a comprehensive overview of our research methodology, key findings associated with the development of a potential herbal therapy against MAP. *Mycobacterium avium* subspecies *paratuberculosis* (MAP) is considered to be the causative agent of Johne's disease, an intestinal chronic infection in ruminants. These bacilli upon transmission through milk and milk products lead to development of Crohn's disease like autoimmune disorders in human beings. Till date, no reliable treatments are available for this pathogenic infection.

The conducted research focuses on the development of a novel herb-based synergistic combination as a potential anti-MAP therapy. Our study involved screening a diverse range of medicinal herbs for their anti-MAP potential using *in vitro* REMA assay. The obtained best active extracts (BAEs) were further assessed for synergy using fractional inhibitory concentration index (FICI). Subsequently, a synergistic combination was formulated to enhance the overall efficacy through the potentiation of individual herb properties. The results demonstrate significant antimycobacterial activity of the herb-based synergistic combination against MAP. Moreover, the combination exhibited promising immunomodulatory properties, suggesting a dual mechanism of action for enhanced efficacy.

Keywords: Mycobacterium avium subspecies *paratuberculosis*, Johne's disease, Crohn's disease, REMA assay

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