

# **Microbial Infections in Reproductive Organs of Women and the Potential Role of *Lactobacillus***

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# CHAPTER 6

Conclusion and Future prospects

## Chapter 6: Conclusion and Future Prospects

### 6.1. Conclusion

#### **Assess the microbial flora from vaginal swabs of healthy reproductive-aged women (21-45 y)**

- Seventy-four aerobic microbes were isolated from the vaginal swabs.
- Thirty-eight isolates were acidophilic and acid producing with potential pathogenicity.
- The aerobic isolates were identified as: *Enterococcus faecalis*, *Enterobacter cloacae*, *Shigella*, *Staphylococcus epidermidis*, *Escherichia fergusonii*, and *Candida albicans*
- Lactic acid bacteria were isolated from vaginal swabs on specific Lactic acid bacteria selective agar media in anaerobic/microaerophilic conditions.
- Three strains of LAB viz: *L. crispatus*, *L. gasseri*, and *L. vaginalis* were isolated.

#### **Characterization of the isolated microbes and studying the interaction between *Lactobacillus* sp. and potential pathogens**

- Potential pathogenic microbes displayed the production of various extracellular enzymes. They were mostly haemolytic, able to grow anaerobically, and possessed biofilm forming ability.
- *L. crispatus* was the only isolate to produce hydrogen peroxide, whereas *L. gasseri* showed better aggregation, co-aggregation, hydrophobicity, bile, and sodium tolerance property.
- *L. crispatus* and *L. gasseri* produced similar levels of lactic acid.
- *L. gasseri* showed the best inhibition of the potential bacterial pathogens followed by *L. crispatus*.
- CFS of *L. crispatus* was more potent against the potential bacterial pathogens.
- *L. gasseri* and its CFS showed the best inhibition of hyphae/biofilm formation of *C. albicans*

- The CFS produced by the LAB showed the presence of: SCFA, antimicrobial peptides, antibiotics, aldehydes, macrolides, terpenoids, hydroxy flavanone, cyclic hydrocarbons, benzoate esters, etc with antimicrobial potential

### **Exploit *Lactobacillus* sp. and their culture free supernatant for future industrial usage**

- Lyophilized *L. crispatus* retained its revival potential for 36 months following storage at 12 °C.
- The *L. crispatus* was also successfully encapsulated into CMC-Alginate beads that could be utilized as an eco-friendly sanitary absorbent with viable LAB for 30 days.
- The CFS acted as a potent spray in controlling the biofilm formation of the microbial consortia on regular use.
- The CFS was also imbibed into the sanitary fabric and showed its potential for use as an additive in sanitary suppositories without diminishing the utility of the fabric.

### **6.2. Future Prospects**

- A correlational study of the shuffling of vaginal microflora with the monthly hormonal cycle would improve the understanding of the vaginal microflora.
- Study of the vaginal microflora of menstruating women would help to understand the microbial population and density of LAB harboured during this period.
- Efficacy of isolated LAB and CFS metabolites against other vaginal pathogens is essential to understand their true potential.
- To study the impact of LAB and CFS metabolites on the vaginal epithelium *in-vivo* and *in-vitro* for their commercial and industrial use.