

Abstract

Evaluation of the Antimicrobial Activity of Kombucha Cellulose Discs Hydrated with *Lactobacillus gasseri* Supernatant[†]

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Introduction: Bacterial cellulose (BC) is a natural biopolymer produced by bacteria and has been widely studied for biomedical applications. In kombucha, bacterial cellulose is generated during fermentation. The lactic acid bacterium *Lactobacillus gasseri* is a probiotic that produces metabolites with antimicrobial activity. This study evaluated the inhibitory capacity of BC discs, obtained from kombucha fermentation and incorporated with *L. gasseri* supernatant (LS), against pathogenic bacteria. **Methodology:** Three strategies were employed: (1) agar diffusion method with BC discs previously incorporated with LS, (2) agar diffusion method with paper discs pipetted with 50 µL of LS, and (3) agar well diffusion method, in which 50 µL of LS were added to the wells. **Results:** The BC discs incorporated with LS exhibited antimicrobial activity, showing inhibition zones of 20.0–30.0 mm against *S. aureus*, 13.7–35.3 mm against *E. coli*, and 19.3–23.7 mm against *E. faecalis*. In contrast, the agar well and paper disc methods containing LS did not produce inhibition zones against the tested microorganisms. The effectiveness of BC discs compared with paper discs and well diffusion can be attributed to the nanometric, porous, and three-dimensional structure of BC, which favors both incorporation and gradual release of bioactive compounds. **Conclusion:** These findings indicate that BC with LS is a promising alternative for use in antimicrobial biomaterials; however, safety and stability studies are still required for potential human application.

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