

Title : Development of Film-forming Wound Dressing Gel from SCOBY Kombucha Combined with Green Tea Extract for Antimicrobial Applications

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ABSTRACT

SCOBY kombucha is a cellulose-based biomaterial derived from bacterial and yeast fermentation, often regarded as a byproduct in kombucha beverage production. This study aimed to develop a wound dressing that incorporates SCOBY kombucha and green tea extract to prevent bacterial skin infections. In this study, fresh SCOBY kombucha was first prepared by neutralization and washed with water several times. The SCOBY was blended and sterilized by autoclaving before being formulated into a film-forming wound dressing gel with green tea extract. The antimicrobial efficacy of green tea extract was assessed by determining its minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) against bacteria causing skin diseases, including *Pseudomonas aeruginosa*, *Staphylococcus aureus*, Methicillin-resistant *Staphylococcus aureus* (MRSA), *Staphylococcus epidermidis*, *Clostridium perfringens* and *Cutibacterium acnes*. The results revealed that green tea extract exhibited the lowest MIC and MBC values 0.98 mg/ml against MRSA. Moreover, green tea extract at 125 mg/ml had the ability to inhibit all tested skin pathogenic bacteria. Following this, the extract (125 mg/ml) was incorporated into SCOBY kombucha, polyvinyl alcohol, glycerol, propylene glycol, and water, which were then developed into a functional film-forming wound dressing gel. These findings highlight the potential of SCOBY kombucha-based wound dressings infused with green tea extract as a promising biomaterial for infection prevention. This study provides insights into the development of sustainable, bioactive wound dressings with applications in biomedical and clinical settings.

Keywords: Green tea, Kombucha, SCOBY, Skin infection, Wound dressing