Abstract

Bacterial cellulose (BC) is a three-dimensional structure made up of nanofibrils that are created by aerobic bacteria such as *K.intermedius* which is able to give a high yield of BC despite it being a relatively new strain. BC is well known for its high crystallinity and water retention which are favorable for encapsulating compounds. BC are also known to have wound healing properties but it lacks antimicrobial activity. Probiotic in this case *S.cerevisiae*, is able to be encapsulated into BC to add antimicrobial activity without triggering antibiotic resistance. *S.cerevisiae* is a well-known probiotic that is able to have an antimicrobial effect against *S.aureus* and *P.aeruginosa* which are both common pathogenic bacteria that are found in wounds.

This study aims to find the most effective method of encapsulating *S.cerevisiae* into BC that is produced by *K.intermedius* as well as testing the antimicrobial activity of the encapsulated *S.cerevisiae*. The encapsulation methods to be tested are adsorption-incubation, injection-incubation and co-culture. The method that yields the highest probiotic loading number will be chosen and is tested for the antimicrobial activity through the Kirby-Bauer test as well as the time kill assay. The results however showed that method of encapsulation does not have an effect on the probiotic loading number hence the most practical method, injection-incubation was chosen instead. *S.cerevisae* probiotic BC produced through injection-incubation method was able to exhibit antimicrobial activity towards *S.aureus* and *P.aeruginosa*. In the Kirby-Bauer test it is able to show that it is more effective against *S.aureus* meanwhile in the time kill assay it has a larger bactericidal activity against *P.aeruginosa*.

Keywords: Bacterial cellulose, encapsulation method, *S.cerevisiae*, *K.intermedius*, antimicrobial activity.