THE EFFECT OF SYNBOTIC Streptococcus salivarius K12 AND YACON (Smallanthus sonchifolius) ON Candida albicans BIOFILM FORMATION

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ABSTRACT

Candida albicans is an opportunistic fungus that is known for its ability to form biofilms. Streptococcus salivarius K12 is an oral probiotic while yacon is a source of prebiotic. The objective of this study is to investigate the effect of S. salivarius K12 and yacon aqueous extract (synbiotic) on C. albicans with the hypothesis that S. salivarius K12 and yacon inhibit C. albicans biofilm formation. To develop mono-species biofilm, C. albicans (ATCC MYA-4901 and cancer isolates, ALC2 and ALC3 strains) and S. salivarius K12 were standardised to 10⁵ cells and 10⁶ cells, respectively and grown in 96-well plate in nutrient broth (NB) or RPMI at 37 °C for 72 h. Polymicrobial biofilms were developed by inoculating both microorganisms in the same well with similar cell number as in mono-species. To determine the effect of the synbiotic, a similar protocol was repeated by mixing with 800 mg mL⁻¹ of yacon extract and incubated at 37 °C for 72 h. The medium was replenished at every 24 h, aseptically. Finally, the biofilms were assessed using the crystal violet assay, and the optical density was measured at OD620nm. The combination of both prebiotic and probiotic has effectively reduced all the C. albicans strain (MYA-4901, ALC2 and ALC3) in both NB and RPMI. All C. albicans strain when grown in polymicrobial with S. salivarius K12 in NB that is predominated by yeast-form C. albicans, exhibited decreased biofilms by 51.3±11.6, 8.20±43.9 and 11.3±82.7%, respectively when compared to the expected biofilms. Meanwhile in RPMI, which C. albicans strain ATCC MYA-4901, ALC2 and ALC3 were predominated by hyphal-form showed decreased biofilms by 43.3±12.1%, 39.4±15.7% and 25.7±56.8%, respectively when compared to the expected biofilms. S. salivarius K12 and yacon extract synbiotic inhibits biofilm formation of C. albicans yeast and hyphal forms thus supported the hypothesis of the present study.

Keywords: Candida albicans, S. salivarius K12, oral cancer, probiotic, biofilm

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