

Effects of *Ophiocordyceps dipterigena* BCC 2073 β -Glucan as a Prebiotic on the in vitro Growth of Probiotic and Pathogenic Bacteria

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Abstract : The β -glucan produced by *Ophiocordyceps dipterigena* BCC 2073 is a (1, 3)- β -D-glucan with highly branching O-6-linked side chains that is resistant to acid hydrolysis (by hydrochloric acid and porcine pancreatic α -amylase). This β -glucan can be utilized as a prebiotic due to its advantageous structural and biological properties. The effects of using this β -glucan as the sole carbon source for the in vitro growth of two probiotic bacteria (*L. acidophilus* BCC 13938 and *B. animalis* ATCC 25527) were investigated. Compared with the effect of using 1% glucose or fructo-oligosaccharide (FOS) as the sole carbon source, using 1% β -glucan for this purpose showed that this prebiotic supported and stimulated the growth of both types of probiotic bacteria and induced them to produce the highest levels of metabolites during their growth. The highest levels of lactic and acetic acid, 10.04 g \cdot L⁻¹ and 2.82 g \cdot L⁻¹, respectively, were observed at 2 h of cultivation using glucose as the sole carbon source. Furthermore, the fermentation broth obtained using 1% β -glucan as the sole carbon source had greater antibacterial activity against selected pathogenic bacteria (*B. subtilis* TISTR 008, *E. coli* TISTR 780, and *S. typhimurium* TISTR 292) than did the broths prepared using glucose or FOS as the sole carbon source. The fermentation broth obtained by growing *L. acidophilus* BCC 13938 in the presence of β -glucan inhibited the growth of *B. subtilis* TISTR 008 by more than 70% and inhibited the growth of both *S. typhimurium* TISTR 292 and *E. coli* TISTR 780 by more than 90%. In conclusion, *O. dipterigena* BCC 2073 is a potential source of a β -glucan prebiotic that could be used for commercial production in the near future.

Keywords : beta-glucan, *Ophiocordyceps dipterigena*, prebiotic, probiotic, antimicrobial

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