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IMMUNOSTIMULATING ACTIVITY OF BIO-POLYMERS ISOLATED FROM TAXUS CUSPIDATA AND A BACTERIAL STRAIN RHIZOBIUM MASSILIAE

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The aim of this study is to investigate the isolation and characterization of biochemical properties of water-soluble extracellular polysaccharides (WSP) isolated from a novel bacterial strain *Rhizobium massiliae* CA-1 and polyhydric alcohol (PAL) isolated from *Taxus cuspidata*, respectively. The primary monosaccharide composition of the WSP and PAL was determined to be glucose by HPAEC. Interestingly, no significant amount of any other sugars was observed, however, glycerol and xylitol were identified as the main sugar alcohols in PAL. We evaluated immunomodulatory effects of WSP and PAL on RAW 264.7 macrophage activation. The results showed that the WSP and PAL dose-dependently induced the release of the pro-inflammatory cytokines such as TNF-α and IL-6, respectively. Furthermore, treatment of RAW 264.7 cells with PAL for 24 h remarkably increased the phosphorylation levels of ERK, p38 and JNK in a dose-dependent manner, whereas the total protein levels of ERK (t-ERK), p38 (t-p38) and JNK (t-JNK) remained unchanged. In addition, WSP induced nitric oxide synthase (iNOS) expression and increased the production of nitric oxide (NO). Intriguingly, WSP remarkably increased the mRNA expression of Toll-like receptor-2 (TLR-2) and the phosphorylation of MAPKs (ERK, JNK and p38) in RAW 264.7 cells. Furthermore, our results clearly demonstrate that PAL stimulates the immune response in RAW 264.7 cells through the activation of MAPKs (ERK, p38 and JNK) signaling pathway. To the best of our knowledge, this is the first study to demonstrate the primary structure and immune-stimulating activities of PAL from the fruit of *T.cuspidata*. In addition, WSP activates macrophages to secrete pro-inflammatory cytokines and induces iNOS expression via the activation of the TLR-2/MAPKs signaling pathways. Conclusively, we suggest that WSP of *R. massiliae* CA-1 and PAL of *T. cuspidata* can be a new immunomodulatory biopolymers enhancing the early innate immunity. Further studies of other potent biopolymers such as chitosan and beta-glucan are under-going.

Biography

Jae Kweon Park has completed his PhD from Shimane University in 1998, Japan, Postdoctoral and Research Associate studies from The Johns Hopkins University, McGill University and University of Rochester (1998~2007). He is currently working as Professor of the Gachon Univeristy from 2011, Korea. He has published more than 50 papers in reputed journals and has been serving as an Editorial Board Member of the *Journal of Chitin and Chitosan*, Korea.

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