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Immobilization of β-1,3-1,4-glucanase from *Bacillus* sp. on porous silica for production of β-glucooligosaccharides

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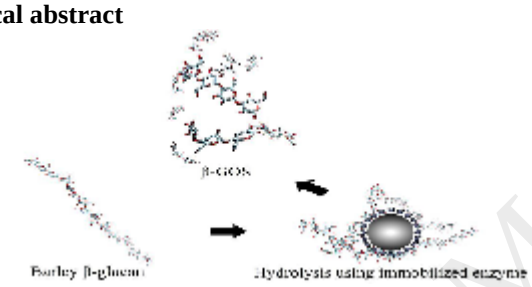
Graphical abstract



HIGHLIGHTS

- *Bacillus* β-1, 3-1, 4-glucanase was immobilized on silica
- Immobilized β-1, 3-1, 4-glucanase was optimized in various conditions
- Storage stability and reusability were measured
- β-glucooligosaccharides were specifically produced from barley β-glucan using immobilized enzyme.

ABSTRACT

(1,3)(1,4)-β-D-glucan has been determined to have various beneficial effects due to its unique structure. β-glucooligosaccharides (β-GOS), which are hydrolysates of barley (1,3)(1,4)-β-D-glucan, provide a useful prebiotic material for selective growth of probiotic bacteria. In this study, recombinant β-1,3-1,4-glucanase (Bg1314) from *Bacillus* sp. SJ-10 (KCCM 90078) was immobilized on porous silica using glutaraldehyde as a crosslinking reagent to achieve efficient production of β-GOS. We investigated the effects of factors such as the amounts of enzyme and glutaraldehyde, reaction temperature, and pH on catalytic activity. Enzyme activity decreased sharply at high concentrations of glutaraldehyde, likely due to the reaction of glutaraldehyde with