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Effect of surfactants on the production and structure of curdlan from *Agrobacterium* sp. ATCC 31749

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The serious envelopment of curdlan on *Agrobacterium* sp. ATCC 31749 during fermentation is a major obstacle to increase curdlan production and the compact macrostructure of curdlan produced from *Agrobacterium* sp. ATCC 31749 limits its application in preparing curdlan β-glucooligosaccharides. In this study, the effects of different surfactants on curdlan production by *Agrobacterium* sp. ATCC 31749 was investigated and several new perspectives concerned with the effect of Tween 80 promoting curdlan production and altering curdlan structure were presented. Maximum curdlan production (51.94 g/L) was achieved when 16 g/L Tween-80 was added at the beginning of the cell growth stage. The addition of Tween-80 at higher concentration inhibited cell growth. However, the addition of 16 g/L Tween-80 enhanced the production of curdlan with a looser ultrastructure, significantly weakened the envelopment of curdlan on *Agrobacterium* sp. ATCC 31749, altered the fine structure of cell membrane and increased the cell membrane permeability. Compared with commercial curdlan, the curdlan with a looser ultrastructure exhibited higher substrate-binding affinity and maximum reaction rate when it was used as the substrate for preparing curdlan β-glucooligosaccharides. These findings demonstrate the mechanisms by which Tween-80 enhances curdlan production and provide a cheap and feasible approach to weaken the envelopment of water-insoluble polysaccharides on bacteria. Meanwhile, this paper provides an effective method to produce an ideal substrate so as to prepare oligosaccharides using enzymic degradation.

Biography

Xiaobei Zhan has completed his PhD from Kansans State University in 2004 and is a Professor of Fermentation Engineering from Jiangnan University. He is the Director of Industrial Microbiology and Biological Reaction Engineering Research Center, School of Biotechnology, Jiangnan University and the deputy Director of Key Laboratory of Carbohydrate Chemistry and Biotechnology of Ministry of Education. He is also the ASAE and IFT Institute of United States. His research focus is Technology of high-viscosity fermentation, biosynthesis of microbial polysaccharide, preparation of functional oligosaccharide and design of bioreactor. He has published more than 30 papers in reputed journals.

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