**Exopolysaccharides from a Thermophilic Bacterium *Geobacillus* sp. WSUCF1**

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**Abstract:**

Numerous microorganisms inhabiting harsh niches produce exopolysaccharides as a significant strategy to survive in extreme conditions. The exopolysaccharides synthesized by extremophiles possess distinctive characteristics due to the varied harsh environments which stimulate the microorganisms to produce these biopolymers. Despite many bioprocesses have been designed to yield exopolysaccharides, the production of exopolysaccharides by extremophiles is inefficient compared with mesophilic and neutrophilic exopolysaccharide producers. In this presentation, we will summarize various exopolysaccharides produced by extremophiles, and also discuss potential metabolic and genetic engineering strategies for enhanced yield and modified structure of extremophilic exopolysaccharides. Among the extremophiles, *Geobacillus* sp. strain WSUCF1 is a Gram-positive, spore-forming, aerobic and thermophilic bacterium, isolated from a compost facility. The whole-genome analysis of WSUCF1 was performed to disclose the essential genes correlated with nucleotide sugar precursor biosynthesis, assembly of monosaccharide units, export of the polysaccharide chain, and regulation of EPS production. Both the biosynthesis pathway and export mechanism of EPS were proposed based on functional annotation. The EPS production by strain WSUCF1 was performed in a 40-L bioreactor using different substrates, and the EPSs were further purified and characterized. The EPSs obtained were tentatively assigned as glucomannan- or mannan-type with mainly α-type glycosidic bond in linear structure, and they are promising as valuable resource for future exploration as drug delivery carriers in biomedical industry due to their non-cytotoxic properties against human embryonic kidney cells.



**Biography:**

Jia Wang recently completed his Ph.D. at South Dakota School of Mines and Technology. He received his Bachelor of Science degree in Biotechnology Pharmacy, and Master of Science degree in Biochemical Pharmacy and Microbiology from Shenyang Pharmaceutical University, PR China. His research is mainly about exopolysaccharides from extremophilic bacteria and bio hydrogen production through consolidated bioprocessing.

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