Bioactive exopolysaccharide from *Neopestalotiopsis* sp. strain SKE15: Production, characterization and optimization

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Abstract

Fungal exopolysaccharides are powerful resources of medicinal applications. *Neopestalotiopsis* sp. SKE15 was iso-lated and identified according to phenotypical and genotypical analyses (GenBank Accession No. MG649986). The exopolysaccharide (EPS) was produced by cultivation of mycelia in broth culture and extracted. The produc-tion was optimized to 2.02 g/l after selection of agitation, temperature, FeSO₄ and K₂HPO₄ concentrations as the most influencing factors using Plackett-Burman design and then by applying response surface methodology. An-alytical Tools showed that the EPS is composed of a polysaccharide ($1.5\text{--}2.1 \times 10^6$ Da) and its probable low mo-lecular weight derivatives, in a wide range of chain lengths, among them an oligosaccharide of about 1970 Da was dominant. GC–MS (Gas chromatography–mass spectrometry) analysis revealed the EPS was mainly constructed from D-glucose, sorbitol and D-galactose. The EPS showed antibacterial activity against *Staphylococcus aureus* ATCC 25923, *Bacillus subtilis* ATCC 6633 and *Pseudomonas aeruginosa* ATCC 27853. DPPH (1,1-diphenyl-2-picryl-hydrazyl) and hydroxyl radical scavenging activity assays showed strong antioxidant activity of the EPS. A challenge with three different cancerous cell lines showed cytotoxic activity of the EPS at final concentration of 100 and 200 µg/ml. Further investigation on medicinal applications of the biopolymer is promising.

Keywords: Fungal biopolymer, Bioactivity, Exopolysaccharide, oligosaccharide, response surface methodology