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## Brevibacillus themoruber: A promising microbial cell factory for exopolysaccharide production (Article)


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### Abstract

Aims: This study aims to identify a high level exopolysaccharide (EPS) producer thermophile that in turn could be used as a model organism to study the biological mechanisms and whole genome organization of EPS-producing thermophilic bacteria. Methods and Results: Thermophilic isolates were screened, and then growth and EPS production of the best producer Brevibacillus thermoruber strain 423 were investigated under different carbon and nitrogen sources, temperature, pH and agitation rates. Rheological characterization revealed that the EPS behaved like a typical Newtonian fluid and viscosity of the EPS solution increased with increasing $Ca^{2+}$ ion concentration. Chemical characterization by TLC, GC-MS, FT-IR and NMR suggested a heteropolymer structure with glucose as major monomer unit. High biocompatibility of pure EPS fractions suggested their potential use in biomedical applications. Conclusions: This study reports on the comprehensive description of microbial production conditions as well as chemical, rheological and biological characterization of the EPS produced by B. thermoruber strain 423. The bioreactor cultures were found to reach two times higher yields and three times higher productivities when compared with literature. Significance and Impact of the Study: Brevibacillus thermoruber strain 423 combined the advantages of its nonpathogenicity with the advantages of fast productivity and hence proved to be a very promising model organism and cell factory for microbial EPS production. © 2013 The Society for Applied Microbiology.



### Author keywords

Bioproduction; Brevibacillus thermoruber; Exopolysaccharide; Microbial; Thermophiles

### Indexed keywords

**EMTREE drug terms:** carbon; exopolysaccharide; glucose; nitrogen

**GEOBASE Subject Index:** genome; growth rate; microbial activity; pH; polysaccharide; temperature effect; thermophilic bacterium

**EMTREE medical terms:** agitation; anion exchange chromatography; article; bacterial cell; bacterial strain; bacterium isolate; Brevibacillus; Brevibacillus themoruber; carbohydrate analysis; carbon source; controlled study; gas chromatography; genome analysis; infrared spectroscopy; nonhuman; nuclear magnetic resonance; nucleotide sequence; pH; temperature; thermophile; thermophilic bacterium; thin layer chromatography

**Species Index:** Brevibacillus; Brevibacillus thermoruber

**Molecular Sequence Numbers:** GENBANK,KF192950(referenced)

**Chemicals and CAS Registry Numbers:** carbon, 7440-44-0; glucose, 50-99-7, 84778-64-3; nitrogen, 7727-37-9

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