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Sequential Optimization Approach for Enhanced Production of Poly(γ -Glutamic Acid) from Newly Isolated *Bacillus subtilis*

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Summary

A bacterial strain of marine origin showing production of poly (γ -glutamic acid) (PGA) has been identified by taxonomical and 16S rRNA studies as *Bacillus subtilis*. A sequential optimization approach was applied for improving the PGA production. The effect of carbon sources, nitrogen sources and pH on the production of PGA was investigated by one factor-at-a-time method. Plackett-Burman design was then adopted to select the most important nutrients influencing the yield of PGA. After identifying the most significant nutrients, response surface methodology (RSM) was used to develop a mathematical model to identify the optimum concentrations of the key nutrients for higher PGA production, and confirm its validity experimentally. PGA production was further improved by supporting the medium with α -ketoglutaric acid. The PGA production increased from 7.64 to 25.38 g/L by using the sequential optimization methods.

Key words: poly(γ -glutamic acid), *Bacillus subtilis*, biopolymer, response surface methodology

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