

Fermentation of *Bacillus thuringiensis* for δ -endotoxin production

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ABSTRACT

Bacillus thuringiensis is a gram-positive soil bacterium characterized by its ability to produce crystalline protein during sporulation. This proteinaceous crystal is exhibited a highly specific insecticidal activity. Mass production of this bioinsecticide, therefore, becomes available by means of fermentation process. A traditional stirred tank (STR) and a modified net-draft tube airlift reactor (ALR) were used throughout this work. Firstly, the effects of agitation speed and aeration rate, in STR, and aeration rate as well as the configuration of draft tube, in ALR, on the volumetric oxygen transfer coefficient (k_La) were investigated. The results show that the k_La value increased with an increase of aeration rate and agitation speed in STR. In the case of ALR, the significant in k_La was also observed with an increase of aeration rate. Subsequently, the effects of cultivation conditions using a STR and ALR were also engaged. The fermentation conditions for STR were : 2.5%(v/v) inocula level, 1 vvm aeration rate at pH7 and 30 °C in different medium compositions. *B. thuringiensis* HD-1, YMB96-1988, A3-4 and YIM303 were used as working strains, and the maximum spore density of 2.32×10^9 spores/mL was obtained under the experimental conditions. The maximum spore concentration of 2.7×10^9 spores/mL was observed under the same conditions as STR with exception of 2.5 vvm aeration rate. Quantitative analysis of conventional spore counting was employed. It will provide the further employed. It will provide the further insight information on the fermentation kinetics as well as the key of the optimum condition for the fermentation process.

Keywords : *Bacillus thuringiensis* ; Crystalline protein ; Net-draft tube airlift reactor

Table of Contents

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REFERENCES

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