Ain Shams University
Faculty of Pharmacy
Microbiology & Immunology Dept.

"A Study on Bacterial production of poly-β-hydroxybutyrate"

A Thesis

Submitted in Partial Fulfillment of the Requirments for the

Master's Degree

In
Pharmaceutical Sciences
(Microbiology and Immunology)

By
Noha Salah Elsayed Yousef

Bachelor of Pharmaceutical Sciences,
Faculty of Pharmacy, Ain Shams University, 2008

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و آخر دعوانا أن الحمد لله رب العالمين...

Noha Salah Elsayed

List of Abbreviations

Abbreviations	Definitions
PHA	Polyhydroxyalkanoates
PHB	Polyhydroxybutyrate
MSM	Mineral salt medium
P_{max}	Maximum PHB productivity
SPP_{max}	Maximum PHB percentage per dry weight

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Abstract
"Studies on bacterial production of poly-β-hydroxybutyrate"

A total number of 251 bacterial isolates were collected from 20 different soil samples. Screening for Polyhydroxyalkanoates (PHA) family resulted in 66 positive bacterial isolates. Afterwards 53 bacterial isolates out of 66 were positive for Poly-β-hydroxybutyrate (PHB) production. These isolates were categorized according to Gram reaction (20 Gram positive and 33 Gram negative). By comparison of PHB specific productivity in each category, three bacterial isolates were chosen as the highest producing members. These isolates were identified by microscopical examination, culture characteristics, biochemical reactions and 16S ribosomal RNA gene sequencing to be Acinetobacter *baumannii*, *Bacillus cereus* and *Azomonas macrocytogenes.*

Mostly the selected isolates produced its maximum PHB productivity in stationary phase then begin using it as a carbon and energy reserve. A series of experiments were done to elucidate the optimum conditions for maximum PHB productivity. First the effect of environmental factors as aeration, incubation temperature and pH were tested followed by effect of culture conditions. Maximum PHB productivity occurred at 60% aeration, 28°C incubation temperature and pH of 7.5 without decreasing biomass in case of *Acinetobacter*