

**FACTORIAL ANALYSIS ON *BACILLUS* SP. REMOVAL USING  
GARLIC SOLUTION**

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**BACHELOR OF CHEMICAL ENGINEERING  
UNIVERSITI MALAYSIA PAHANG**

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SOLUTION**

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Thesis submitted in partial fulfilment of the requirements  
for the award of the degree of  
Bachelor of Chemical Engineering

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### **SUPERVISOR'S DECLARATION**

We hereby declare that we have checked this thesis and in our opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Chemical Engineering.

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### **STUDENT'S DECLARATION**

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree

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Dedicated to my parents and family.

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## LIST OF SYMBOLS

A	Ratio of water to garlic
B	Ratio of Garlic to <i>Bacillus</i> sp.
C	Reaction time between garlic solutions to <i>Bacillus</i> sp.
D	Agitation Speed
%	percentage

**LIST OF ABBREVIATIONS**

OD	Optical density
EPS	Extracellular polymeric substances
<i>B.</i>	<i>Bacillus</i>
<i>P.</i>	<i>Pseudomonas</i>
<i>L.</i>	<i>Listeria</i>
<i>Staph.</i>	<i>Staphylococcus</i>
sp.	Species
UV	Ultraviolet
DT	Definition type
RNA	Ribonucleic Acid
LEO	<i>Lavandula angustifolia</i>
TTO	<i>Melaleuca alternifolia</i>
MEO	<i>Melissa officinalis</i>
v/v	Volume to volume ratio
AIISI	American Iron and Steel Institute
DADS	<i>Diallyl disulfide</i>
DATS	<i>Diallyl trisulfide</i>
MIC	Minimum inhibitory concentration
rpm	Rotations per minute
W/G	Ratio of water to garlic
GS/B	Ratio of garlic solution to <i>Bacillus</i> sp.