

**Optimization of *kojic acid* production from *aspergillus flavus*  
and *aspergillus oryzae* in submerge fermentation**

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Submitted By

Samiya Yaqub  
ID: 15001254010

SUPERVISOR:  
Dr. Tanveer Akber

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**Department of Life Sciences  
School of Science  
University of Management and Technology,  
Lahore, Pakistan  
2017**

**OPTIMIZATION OF *KOJIC ACID* PRODUCTION FROM  
*ASPERGILLUS FLAVUS* AND *ASPERGILLUS ORYZAE* IN  
SUBMERGE FERMENTATION**

Submitted to University of Management and Technology Lahore

In partial fulfillment of the requirements

for the award of degree of

**MS  
BIOTECHNOLOGY**

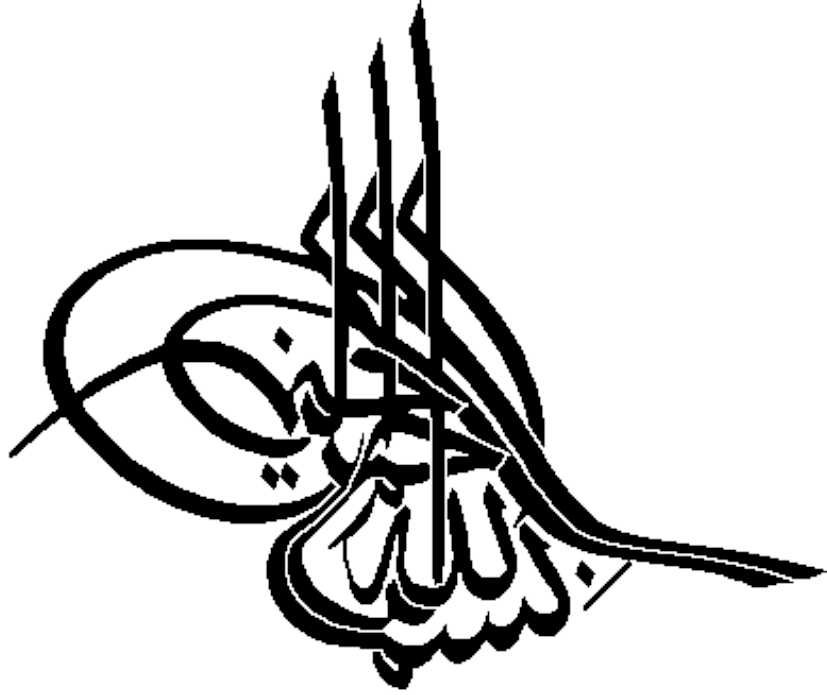
**BY  
SAMIYA YAQUB**

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**SESSION: 2015-2017**

**Department of Life Sciences  
School of Science  
University of Management and Technology,  
Lahore, Pakistan**



*In the name of*

*Allah,*

*The most Compassionate,*

*The most merciful*

## **DECLARATION**

I SAMIYA YAQUB, D/O MUHAMMAD YAQUB MEHBOOB  
ID: 15001254010 Session **2015-2017** aware of and understand the university's policy on  
plagiarism and I certify that this thesis titled **“Optimization of *Kojic acid* production  
from *Aspergillus flavus* and *Aspergillus oryzae* in submerge fermentation”** is my  
own work, except where indicated by referencing, and the work presented in it has not been  
submitted in support of another degree or qualification from this or any other university or  
institute of learning.

All experimental work belong to me; the collaborative contributions have been indicated  
clearly and acknowledged. Due references have been provided on all supporting literatures  
and resources.

Dated: \_\_\_\_\_

\_\_\_\_\_  
( )

## DEDICATION

*I dedicate*

*My work to*

*Allah Almighty first*

*And then to my beloved Parents and my Chachu*

*for their endless support during my whole educational career.*

## **ACKNOWLEDGEMENT**

All the praises are for **ALMIGHTY ALLAH**, who is the most beneficent and merciful. I want to thanks **ALMIGHTY ALLAH**, who created this universe and bestowed the mankind and me with knowledge and wisdom. **HE** invigorates me with the ability to accomplish this task of research work and to contribute a drop to the existing ocean of scientific knowledge.

Trembling lips and wet eyes to praise for **PROPHET MUHAMMAD (S.A.W.W)** the city of knowledge, torch of guided who guided His ummah to the knowledge from cradle to grave. The preaching and examples set by our **HOLY PROPHET MUHAMMAD (S.A.W.W)** will remain forever source of guidance for Muslims and whole humanity.

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## **ABSTRACT**

*Kojic acid* is an organic acid obtained from various species of *Aspergillus* through fermentation. Its demand is very high in cosmetic industries as it is a good alternate of carcinogenic Hydroquinone. Beside its cosmetic use and importance, it has grabbed a vital position in Pharmaceuticals, Food and Agriculture industries. Current study was designed for production and purification of *Kojic acid* crystals from local *Aspergillus* species, *Aspergillus flavus* and *Aspergillus oryzae*. The effect of pH, temperature, static and non-static (shaker) condition on *Kojic acid* yield in submerge fermentation was examined. Significant yield of *Kojic acid* crystal was obtained by *A. flavus* as compared to *A. oryzae*. Optimized conditions were pH 4.5 for (*A. flavus*), pH 3.5 for (*A. oryzae*), temperature 30 °C, 20 days incubation period.

We have found that high yield of *Kojic acid* crystals are produced under static condition (16 gram per litter in *A. flavus* and 11 gram per litter in *A.oryzae*) as compared to non- static (shaker) conditions (6 gram per litter in *A. flavus* and 5 gram per litter in *A. oryzae*). Quantitative estimation of *Kojic acid* was done by Bentley's colorimetric method and conformation through TLC and HPLC. We were successful to get high yield of *Kojic acid* under optimized conditions.

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## Preface

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## INTRODUCTION

### **1.1 *Kojic acid*:**

*Kojic acid* is an organic chelation Agent used as decolorizing agent. It is well-known for its use in Cosmetics Industry. Besides its cosmetic importance, it has grasped a significant position in Food, Agriculture, Health care and Pharmaceuticals etc. (Bentley, 2006). K. Saito, a Japanese scientist discovered *Kojic acid* in 1907 from the mushroom present on steamed rice. Koji stands for rice in Japanese language and likewise the name of *Kojic acid* was given to this acid by Yabuta in 1913



## Chapter 5

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