Optimization of kojic acid production from *aspergillus flavus* and *aspargillus oryzae* in Solid state fermentation

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In the name of

ALLAH,

The most Compassionate,

The most Merciful

“Research is what I’m doing when

I don’t know what I’m doing”

- *Wernher von Braun*

DECLARATION

I Afia Zahoor D/O Zahoor ul Haq ID: 15001254006 Session 2015-2017 have declare that the matter printed in the thesis dissertation titled "**Optimization of Kojic Acid production from *Aspergillus flavus* and *Aspergillus Oryzae* in solid state fermentation** "which I here submit for the research qualification **M.S Degree In Biotechnology** to the Department of Life Sciences, School of Science, University of Management and Technology, Lahore, Pakistan is apart from the recognized assistance of my supervisors, my own work and has not been previously submitted as research work, thesis or publication in any form in any University, research institution etc. in Pakistan or abroad to obtain a research diploma or degree.

Dated: _____ (Afia Zahoor)

DEDICATION

I dedicate this thesis in the honor of our beloved Prophet Hazrat Muhammad (P.B.U.H) and my parents especially to my father (Zahoor ul Haq) without your motivation love and prayers, I could never be able to advance in life.

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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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AFIA ZAHOOR

ABSTRACT

Kojic Acid is a fungal secondary metabolite that can be obtained naturally by the fermentation of fungal species. *Aspergillus* is considered to be the best specie for the production of kojic acid. Kojic Acid has numerous uses in health, cosmetics and pharmaceutical industries. In order to get the highest yield of kojic aid we have used local strains of *Aspergillus* that was *Aspergillus flavus* and *Aspergillus oryzae.* Both strains were giving yield of Kojic Acid in solid state fermentation. Glucose and sucrose were used as carbon source, ammonium nitrate used as a nitrogen source at optimized pH and temperature. Given temperature was 25^{O}C, 30^{O}C, 35^{O}C and 40^{O}C, while given pH was 3.5, 4.5, 5.5, 6.5, 7.5, and 8.5. Highest yield of Kojic Acid was obtained by *Aspergillus flavus* and *Aspergillus oryzae* at 30^{O}C. *Aspergillus flavus* shown best result at pH 4.5 and 3.5 was the optimized pH for *Aspergillus oryzae.* Here we have get the highest yield of Kojic Acid by using local species of *Aspergillus* by optimizing the conditions.

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INTRODUCTION

1.1 Kojic acid

Kojic Acid is a secondary fungal metabolite that is obtained from fungus species. These species are *Aspergillus oryzae* and *Aspergillus flavus.* It is an organic acid. Both are considered as best fungal strain to produce the Kojic Acid (Rosfarizan *et al*., 2010). To produce Kojic Acid biologically active strains of fungus undergo aerobic fermentation by using different substrates (El-Aasar, 2006; El-Kady *et al*., 2007; Wakisaka *et al*., 1998). They are producing Kojic Acid as a metabolic by product of fermentation. They are also producing molds. These molds are very useful for the production of fermented products like distilled liquor, sweet beverage, and sweet alcoholic seasoning that is most commonly used in Japan (Niwa *et al*., 2010).