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ترد بالاصل



STUDIES ON THE BIOCONVERSION OF GLYCYRRHIZIN

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2005

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صورة الإسراء الآية ٨٠

DEDICATION

To my dearest parents

To my beloved husband

To my family

*I wish them the very best
of all for ever.*

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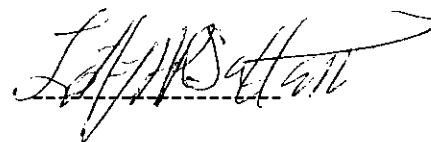


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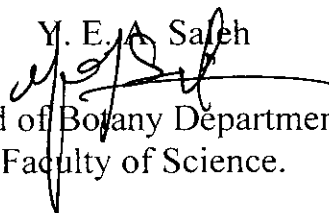
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ACKNOWLEDGEMENT

I wish to express my sincere gratitude to **Prof. Dr. A. M. Salama**, Professor of Botany, Faculty of science Cairo University for his kind help and constructive criticism.

I am also indebted to **Prof. Dr. L.A. Sallam**, Professor of Natural and microbial Products Chemistry, National Research Center, Cairo, for continuous encouragement, valuable guidance as well as reviewing this work.

My deep thanks and appreciation are also extended to **Prof. Dr. A.H. El-Refai**, Professor of Natural and Microbial Products Chemistry, National Research Center, for his valuable instructions in the experimental work and sincere help in preparing the manuscript. My sincere gratitude is greatly expressed to him.

Grateful thanks are also extended to **Dr. H.A. El-Minofy**, Assistant Professor of Natural and microbial Products Chemistry, National Research Center, for suggesting the topic of this work, valuable supervision during the experimental work and continuous help. My heartfelt gratitude is expressed to him.

Sincere thanks are also extended to **Dr. N. A. Hassan**, Assistant professor of Photochemistry, supervisor on FT-IR, FT-Raman Laboratory, Central Laboratory Services, National research Center, **Dr. A.E.M. Gaafar**, Assistant Professor of Photochemistry, Supervisor on NMR Laboratory, Central Laboratory Supervisor, National Research Center and **Prof. Dr. A. G. Hanna**, Professor of Natural and Microbial Products Chemistry, National Research Center, for caring out the spectral analysis and their kind help in elucidation of the chemical structures of the transformation product and reviewing this part of work.

Moreover, the authoress would like to acknowledge gratefully all the members of the Department of Chemistry of Microbial and Natural Products for their cooperation and help which enabled this work to be accomplished.

LIST OF ABBREVIATIONS

GL	= Glycyrrhizin, Glycyrrhizinic acid
GA	= Glycyrrhetic acid, Glycyrrhetinic acid
GAMG	= Glycyrrhetic acid monoglucuronide
3-oxo-GA	= 3-oxo-glycyrrhetic acid
CLS	= Corn steep liquor
T.B.E.	= Total bioconversion efficiency

ABSTRACT

Hala Abdel Salam Amin. Studies on the Bioconversion of Glycyrrhizin. Ph. D. Cairo University, Faculty of Science, Botany Department, 2005.

Glycyrrhizin (GL), the well-known sweet saponin of licorice, has been used as a food-additive and as a medicine. Its aglycone, glycyrrhetic acid (GA) showed antiinflammatory, antiulcer and antiviral properties. GA is now produced from GL by acid hydrolysis. However, it is difficult to obtain GA in a good yield by this method, because many by-products are also produced.

To produce GA from GL, we have screened microorganisms for activity to hydrolyze GL. It was found that *Aspergillus niger* NRRL 595 hydrolyzed GL to yield Glycyrrhetic acid (GA) and 3-oxo-glycyrrhetic acid (3-oxo-GA). The conditions for cultivation of this fungus with the maximum hydrolytic activity for the maximum yield of GA were investigated. Based on the results, *A. niger* NRRL 595 was cultivated with a medium composed of 1.75 % GL, 0.5 % glucose, 0.8 % corn steep liquor at pH 6.5 at 32°C for 96 h. The cultivation of fungal cells under the latter conditions afforded GA and 3-oxo-GA in a yield of 65 % and 22 %, respectively.

A. niger NRRL 595 cells and spores - immobilized by entrapment in calcium alginate and adsorbing on glass wool - were used for hydrolysis of GL to GA and 3-oxo-GA. The bioconversion efficiencies of

the immobilized cultures were less than those obtained with the free cells. In contrast to that, repeated batch biotransformation with fungal spores immobilized on glass wool could be successfully maintained for longer than 40 days. During the first 12 days of operation, (i.e. three batch cycles), the bioconversion efficiencies increased gradually and reached 93 % at the third run.

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