

# BIOCHEMICAL STUDIES ON THE PRODUCTION OF ANTIBIOTICS

By

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(B.Sc. Ain Shams University 1987)



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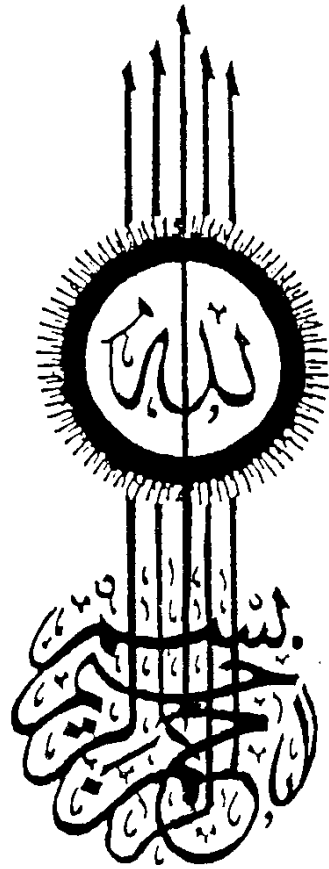
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بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

«وَأَمْ لَيْسَ لِلْإِنْسَانِ إِلَّا مَا سَعَىٰ \*

وَأَمْ سَعَىٰ سَعَىٰ سَوْفَ يَرَىٰ \*

ثُمَّ يَجْزَاهُ الْجَزَاءَ الْأَوْفَىٰ \*»

صدق الله العظيم

[ سورة النجم، الآيات ٣٩، ٤٠، ٤١ ]

TO MY DEAREST FATHER AND MOTHER,  
TO MY MOST KIND BROTHER AND  
TO MY BELOVED HUSBAND.

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## TABLE OF CONTENTS

	Page
<b>PREFACE</b>	
<b>OBJECT OF INVESTIGATION</b>	
<b>I - REVIEW OF LITERATURE</b>	1
<b>II - MATERIALS AND METHODS</b>	34
I - Cultivation of the Experimental Organisms	34
I.1. Experimental organisms	34
I.2. Preparation of cultures	35
I.3. Fermentation media	35
II - Measurements of the pH Value	38
III - Determination of the Total Dry Weight	38
IV - Cultivation of the Test Organism	38
IV.1. Test organism	38
IV.2. Preparation of culture	39
IV.3. Preparation of the spores suspension	39
V - Determination of Oxytetracycline in the Fermentation Broth	39
VI - Physical Mutation	41
VI.1. Gamma irradiation	41
VI.2. U.V.-irradiation	43
VII - Chemical mutation	43
VIII - Description of <u>Streptomyces rimosus</u> NRC 50 and <u>Strepto- myces rimosus</u> NRC 34	44

	<b>Page</b>
IX - Chromatographic Identification	47
X - Extraction of Oxytetracycline	49
X.1. Extraction of oxytetracycline by butanol	49
X.2. Adsorption of oxytetracycline by charcoal	49
XI - Purification of oxytetracycline	50
<b>III - RESULTS AND DISCUSSION</b>	<b>52</b>
CHAPTER (I)	
I.1. Survey of <u>Streptomyces</u> spp. for the Production of Oxytetracycline on Different Media	52
II.2. Physiology of Oxytetracycline Formation by <u>Streptomyces rimosus</u> IMRU 3558	56
I.2.1. Effect of the incubation period on <u>Streptomyces rimosus</u> IMRU 3558	56
I.2.2. Influence of different carbon/nitrogen contents ratios on the biosynthesis of oxytetracycline by <u>Streptomyces rimosus</u> IMRU 3558	59
I.2.3. Effect of different amino-acids on the biosynthesis of oxytetracycline	62
I.2.4. Effect of different concentrations of N-acetylglycine on the biosynthesis of oxytetracycline	65
I.2.5. Effect of different acetate salts on the oxytetracycline production	67
I.2.6. Effect of different concentrations of magnesium acetate salt on the oxytetracycline production	69

	Page
I.2.7. Effect of different natural organic nitrogen sources on the biosynthesis of oxytetracycline by <u>Streptomyces rimosus</u> IMRU 3558	71
I.2.8. Effect of different concentrations of casein on the biosynthesis of oxytetracycline	73
CHAPTER (II)	
II.1. Improvement of Oxytetracycline Productivity by <u>Streptomyces rimosus</u> IMRU 3558 Using Different Mutagenic Agents	76
II.1.1. Effect of gamma irradiation of <u>Streptomyces rimosus</u> IMRU 3558 on oxytetracycline biosynthesis	76
II.1.2. Effect of chemical mutagenesis on <u>Streptomyces rimosus</u> IMRU 3558	90
II.1.3. Effect of chemical mutagenesis on <u>Streptomyces rimosus</u> NRC 50	99
II.1.4. Effect of U.V.-irradiation on <u>Streptomyces rimosus</u> IMRU 3558	108
II.1.5. Effect of U.V.-irradiation on <u>Streptomyces rimosus</u> NRC 50	117
II.2. Description, Frequency of Variants and Chromatographic Identification of the Isolated Mutants of <u>Streptomyces rimosus</u> IMRU 3558	125
II.2.1. Description and cultural characteristics of <u>Streptomyces rimosus</u> NRC 50 and NRC 34	125
II.2.2. Study of the frequency of variants in percentage of the whole number of isolates	133

	<b>Page</b>
II.2.3. Thin layer chromatographic identification of oxy- tetracycline produced by <u>Streptomyces rimosus</u> IMRU 3558 and its mutants strains NRC 50 and NRC 34	139
<b>CHAPTER (III)</b>	
III - Extraction, Purification and Identification of Oxytetra- cycline Produced from <u>Streptomyces rimosus</u> IMRU 3558 and its Isolated Mutants NRC 50 and NRC 34	140
III.1. Thin layer chromatography of oxytetracycline	140
III.2. Extraction of oxytetracycline present in the fermen- tation medium of <u>Streptomyces rimosus</u> IMRU 3558	145
III.3. Extraction of oxytetracycline from the fermentation broth using n-butanol	148
III.4. Extraction of oxytetracycline from the fermentation broth of <u>Streptomyces rimosus</u> IMRU 3558 using the adsorption method	150
III.5. Purification of oxytetracycline using Sephadex LH-20 columns	152
III.5.1. Purification of oxytetracycline using a Sephadex LH-20 acidic column	152
III.5.2. Purification of oxytetracycline using a Sephadex LH-20 alkaline column	154
<b>III - GENERAL DISCUSSION</b>	156
<b>IV - SUMMARY</b>	164
<b>V - REFERENCES</b>	169
<b>VI - ARABIC SUMMARY</b>	

## P R E F A C E

The period since world war two has seen the establishment and extremely rapid growth of a major new industry, the use of microorganisms for the synthesis of chemotherapeutic agents, particularly antibiotics, enzymes and hormones. The development of this new industry has had a dramatic and far reaching social impact. Nearly all bacterial infectious diseases which were, prior to the antibiotic era, major causes of human death have been brought under control by the use of these drugs.

The development of the tetracycline antibiotics, stimulated by the recognition of the therapeutic significance of penicillin and streptomycin, was the result of a systematic screening for antibiotic producing microorganisms from soil specimens collected from many parts of the world. The first of these compounds, chlorotetracycline, was introduced in 1948. Two years later, oxytetracycline became available. Elucidation of the chemical structure of these agents confirmed their similarity and furnished the basis for the production of a third member of this group, tetracycline, in 1952.

Oxytetracycline, which is mainly elaborated by Streptomyces rimosus, has been successfully used in the treatment of a wide variety of infectious diseases because of its broad range of activity against bacteria, spirochetes, rickettsiae,

large viruses, actinomycetes and even some protozoa and metazoa.

The aim of this work was to select an active oxytetracycline producing organism, adjusting its physiological conditions by changing in the medium compositions and then increasing its productivity by subjecting it to both physical and chemical mutagens as well as their combined effect. The oxytetracycline was finally extracted from the fermentation broth and isolated in a pure state.

### OBJECT OF INVESTIGATION

The aim of this work is to study and improve the oxytetracycline antibiotic production by Streptomyces spp. and to isolate it in a pure state. This include several steps:

1. Selection of the best organism which produce oxytetracycline and studying the physiological factors affecting on its production ability.
2. Study of the effect of adding some organic compounds to the fermentation medium to induce or to act as precursors for oxytetracycline biosynthesis.
3. Study of the effect of genetic factors (physical or chemical) to increase the oxytetracycline productivity by the micro-organisms.
4. Isolation and purification of the antibiotic by physical and chromatographic methods.