

**BIOSYNTHESIS OF ANTHRAQUINONE
PIGMENT FROM SOME FUNGI**

By

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B.Sc. Agric.Sc.(Agric. Microbiology), Ain Shams University, 2007

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Approval sheet

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ABSTRACT

Alshimaa Atta Allah Mohammad Ahmad Alshrquawey: Studies on Biosynthesis of anthraquinone pigment from some fungi. Unpublished M.Sc. Thesis, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University, 2016.

In the present study, sixty isolates belonging to the genus *Fusarium* were isolated from different isolation sources; twelve of them showed a high pigment production. The twelve *Fusarium* isolates were screened for fusaric acid production to exclude the isolates can synthesize this toxin. Five of them showed no capability to produce this toxin. Two *Fusarium* isolates of the five isolates were evaluated as potential producers of anthraquinone pigment and identified as *F. arthosporioides* and *F. verticellioides* since the production yields were 650 and 275.8 $\mu\text{g/g}$ respectively. The anthraquinone produced by selected *Fusarium* strains was characterized by HPLC. Efficiency of pigment production at various values of pH, temperature, and five variable growth media revealed that for *F. arthosporioides*, the maximized anthraquinone titer was achieved at tenth day of incubation period, pH 6.5, 30°C under shaking and light conditions. For *F. verticellioides*, the highest anthraquinone yield was accomplished at tenth day of incubation period pH 6.0, 25°C under static and dark conditions. Results evaluated that gamma irradiation caused reduction on the viable of both fungal counts and this reduction was parallel to increasing of irradiation doses since the D_{10} for *F. arthosporioides* and *F. verticellioides* was 0.33, 0.77 kGy respectively. Ionizing (gamma) and non-ionizing (UV) irradiations showed positive effect on anthraquinone production by *F. verticellioides* since 0.25 kGy enhanced the anthraquinone yield by nearly two fold than unirradiated

(control) sample. After 10 min of exposure to U.V, concentration of anthraquinone reached 212 µg/100 ml. Seven different wastes were used to reduce the cost of anthraquinone production by using them as low cost media. Produced anthraquinone by both strains showed antimicrobial activity against pathogenic bacteria *Bacillus cereus*, *Staphylococcus aureus*, *Salmonella typhi*, *Pseudomonas aeruginosa* followed by *Escherichia coli* and *Candida albicans*, In addition it showed dyeing ability to wool and polyester fibers in vitro. Produced anthraquinone had no cytotoxic effect on normal (clone-9) cells till 0.5 µg.

Key words: *Fusarium spp.*, Anthraquinones, Optimization, Ionizing and non-ionizing irradiations, wastes, HPLC.

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CONTENTS

Title	Page No.
LIST OF TABLES	V
LIST OF FIGURS	VII
LIST OF ABBRIVIATIONS	IX
INTRODUCTION	1
LITRATURE REVIEW	5
1. Pigments in life, meaning, evolution and classification	5
2. Natural pigments	6
2.1 Natural pigments and food industry	7
2.2 Natural pigments and pharmaceuticals	7
2.3 Natural pigments and textile dyeing	8
3. Microbial pigments	9
3.1 Photosynthesis pigments	10
3.2 Photosensitizing pigments	11
3.3 Monascus pigments	11
3.4 Melanin pigment	12
3.5 Carotenoids pigments	12
3.6 Phenazine pigment	13
3.7 Quinones pigments	13
4. Anthraquinones	15
5. Fungal anthraquinone	16
6. Biosynthesis and characterization of anthraquinones	18
7. Applications of anthraquinones	18
7.1 Anthraquinones and medical applications	18
7.2 Anthraquinones and industrial applications	19
7.2.1 Manufacturing of hydrogen peroxide	19
7.2.2 Manufacturing of paper (Pulping process)	20
7.2.3 Manufacturing of textile dyes	21
7.2.4 Aquaculture industry	21

7.3 Anthraquinones and food stuffs	22
7.4 Anthraquinones and modern technology	22
7.4.1 Semiconductors	22
7.4.2 Solar cells	23
7.5 Anthraquinones and waste water treatment	23
8. Factors affecting anthraquinone production	24
8.1 Hydrogen ion concentration (pH)	24
8.2 Incubation temperature	25
8.3 Aeration and illumination conditions	25
8.4 Nutritional factors	27
8.5 Carbon and Nitrogen sources	27
9. Radiation	28
9.1 Ionizing Radiation	28
9.2 Non-ionizing Radiation	30
MATERIALS AND METHODS	35
1. Soil and infected plants samples collection	35
2. Isolation and purification process of fungal isolates	35
3. Primarily pigment detection	36
2. Estimation of fusaric acid	36
3. Anthraquinone pigment:production and extraction	37
4. Identification and characterization of anthraquinone pigment	37
5. Identification of fungal isolates	38
6. Fungal growth	39
7. Factors affecting anthraquinone pigment production	39
9.1 Incubation period	39
9.2 Hydrogen ion concentration	39
9.3 Incubation temperature	39
9.4 Illumination conditions	40
9.5 Aeration conditions	40
9.6 Different media	40
9.6 Different wastes	40

8. Irradiation studies	41
10.1 Inoculum preparation	41
10.2 Source of gamma radiation	41
10.3 Ionizing irradiation	41
10.4 Non-ionizing irradiation	42
9. Applications of produced anthraquinone	43
11.1 Antimicrobial activity of extracted anthraquinone	43
11.2 Dying textiles	43
10. Cytotoxicity of extracted anthraquinone	44
11. Media	44
12. Statistical analysis	44
RESULTS AND DISCUSSION	45
Part one: Isolation, screening and identification	46
1. Isolation of <i>Fusarium</i> isolates from different soils and plants sources	46
1.1 Collection of soils and infected plants samples	46
1.2 Preliminary identification of <i>Fusarium</i> isolates	47
1.3 Percentage distribution of <i>Fusarium</i> isolates in soils and plant samples.	47
2. Preliminary screening of <i>Fusarium</i> isolates for pigment production	52
3. Detection of fusaric acid toxin produced by highly pigment production isolates	56
4. Screening for anthraquinone production	58
5. Identification of the selected fungal isolates	60
Part two: Factors affecting anthraquinone production	61
6. Factors affecting anthraquinone production	61
6.1 Incubation period	61
6.2 Hydrogen ion concentration (pH)	65
6.3 Incubation temperature	70
6.4 Aeration and illumination conditions	74

6.5 Media	82
7. Effect of different wastes on anthraquinone production by selected strains.	87
Part three: Radiation studies	91
8. Radiation:	91
8.1 Radiation resistance of selected <i>Fusarium</i> strains (D_{10} -value)	92
8.2. Effect of different doses of the ionizing radiation (Gamma) on the growth and anthraquinone production by selected fungal strains	96
8.3. Effect of non-ionizing radiation (U.V) on the growth and anthraquinone production by selected strains	100
Part four: Applications on produced anthraquinone	104
9. Applications on produced anthraquinone	104
9.1. Antimicrobial Activity of extracted anthraquinone	104
9.2. Dyeing textile	107
Part five: Cytotoxicity	109
10. Cytotoxicity of produced anthraquinone	109
SUMMARY	111
Appendix	115
REFERENCES	119
الملخص العربي	

LIST OF TABLES

Table No.	Title	Page No.
1.	Isolation of <i>Fusarium</i> isolates from soil	48
2.	Isolation of <i>Fusarium</i> isolates from infected plants	49
3.	Pigment production from <i>Fusarium</i> cultures isolated from soil	54
4.	Pigment production from <i>Fusarium</i> cultures isolated from infected plants	55
5.	Detection of fusaric acid toxin produced by highly pigment production isolates	57
6.	The quantity of anthraquinone produced in liquid culture by the selected <i>Fusarium</i> isolates	59
7.	Effect of incubation period on growth and anthraquinone production by <i>Fusarium arthosporioides</i>	62
8.	Effect of incubation period on growth and anthraquinone production by <i>Fusarium verticillioides</i>	63
9.	Effect of pH values on growth and anthraquinone production by <i>F. arthosporioides</i>	66
10.	Effect of pH values on growth and anthraquinone production by <i>Fusarium verticillioides</i>	67
11.	Effect of different incubation temperatures on growth and anthraquinone production by <i>F. arthosporioides</i>	71
12.	Effect of different incubation temperatures on the growth and Anthraquinone production by <i>Fusarium verticillioides</i>	72
13.	The dual effect of aeration and illumination conditions on growth and anthraquinone production by <i>F. arthosporioides</i>	77

14.	The dual effect of aeration and illumination conditions on growth and anthraquinone production by <i>F. verticillioides</i>	79
15.	Effect of different media on growth and anthraquinone production by <i>Fusarium arthosporioides</i>	83
16.	Effect of different media on growth and anthraquinone production by <i>F. verticillioides</i>	84
17.	Anthraquinone production by selected <i>Fusarium</i> strains grown on different wastes	88
18.	Effect of different doses of the Gamma radiation on the viability of <i>Fusarium arthosporioides</i>	93
19.	Effect of different doses of the Gamma radiation on the viability of <i>F. verticillioides</i>	94
20.	Effect of different doses of the ionizing radiation (Gamma) on growth and anthraquinone production by <i>F. arthosporioides</i>	98
21.	Effect of different doses of the ionizing radiation (Gamma) on growth and anthraquinone production by <i>F. verticillioides</i>	99
22.	Effect of different doses of the non ionizing radiation (U.V) on growth and anthraquinone production by <i>F. arthosporioides</i>	101
23.	Effect of non-ionizing radiation (U.V) on growth and anthraquinone production by <i>F. verticillioides</i>	102
24.	Antimicrobial activity of produced anthraquinone by selected strains	105
25.	Effect of extracted anthraquinone on clone-9 cells	109

LIST OF FIGERUS

Figure No.	Title	Page No.
1.	Basic skeleton of anthraquinones	15
2.	Percentage distribution of <i>Fusarium</i> isolates from soil	50
3.	Percentage distribution of <i>Fusarium</i> isolates from infected plants	51
4.	Positive and negative result of qualitative detection of fusaric acid by using TLC technique	57
5.	Standard curve for anthraquinone concentrations	58
6.	The quantity of anthraquinone produced in liquid culture by the selected <i>Fusarium</i> isolates	59
7.	HPLC spectra of anthraquinone by the most efficient <i>Fusarium</i> isolates	60
8.	Effect of incubation period on growth and anthraquinone production by <i>Fusarium arthosporioides</i>	63
9.	Effect of incubation period on growth and anthraquinone production by <i>Fusarium verticellioides</i>	64
10.	Effect of pH values on growth and anthraquinone prouduction by <i>F. arthosporioides</i>	66
11.	Effect of pH values on growth and anthraquinone production by <i>Fusarium verticillioides</i>	67
12.	Effect of different incubation temperatures on growth and anthraquinone prouduction by <i>F. arthosporioides</i>	72
13.	Effect of different incubation temperatures on growth and anthraquinone prouduction by <i>Fusarium verticellioides</i>	73
14.	The dual effect of aeration and illumination conditions on growth and anthraquinone production by <i>Fusarium arthosporioides</i>	78

VIII

15.	The dual effect of aeration and illumination conditions on growth and anthraquinone production by <i>F. verticillioides</i>	80
16.	Effect of different media on growth and anthraquinone production by <i>Fusarium arthosporioides</i>	83
17.	Effect of different media on growth and anthraquinone production by <i>F. verticillioides</i>	84
18.	Anthraquinone pigment produced by <i>F. arthosporioides</i> before inoculation and after incubation	85
19.	Anthraquinone production by selected <i>Fusarium</i> strains grown on different wastes	88
20.	Dose response curve of <i>Fusarium arthosporioides</i>	94
21.	Dose response curve of <i>Fusarium verticillioides</i>	95
22.	Effect of different doses of the ionizing radiation (Gamma) on growth and Anthraquinone production by <i>F. arthosporioides</i>	98
23.	Effect of different doses of the ionizing radiation (Gamma) on growth and anthraquinone production by <i>F. verticillioides</i>	99
24.	Effect of different doses of the non ionizing radiation (U.V) on growth and Anthraquinone production by <i>F. arthosporioides</i>	102
25.	Effect of non-ionizing radiation (U.V) on growth and anthraquinone production by <i>F. verticillioides</i>	103
26.	Antimicrobial activity of produced anthraquinone by selected strains	106
27.	The dyeing ability of produced anthraquinone	108
28.	Effect of extracted anthraquinone on clone-9 cells	110