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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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 Unpublished M.Sc.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 µg/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. After10 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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