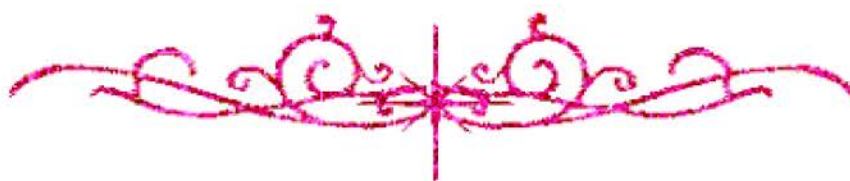


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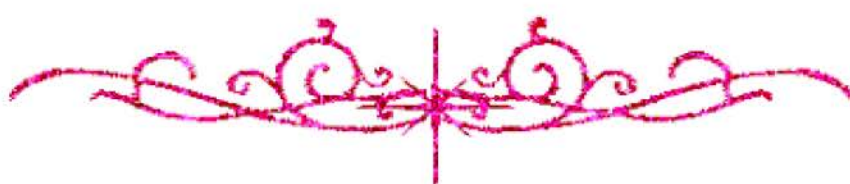
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شبكة المعلومات الجامعية



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

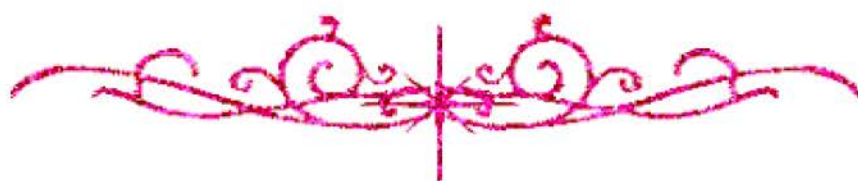
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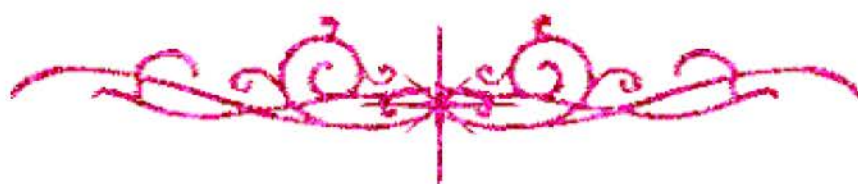
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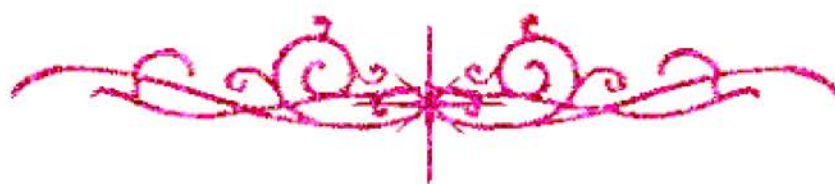
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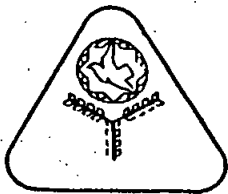


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بالرسالة صفحات لم ترد بالأصل





Menoufiya University

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Botany Department

MICROBIOLOGICAL LEACHING OF URANIUM FROM SOME EGYPTIAN ORES ALLOGA AREA, SOUTH WESTERN SINAI

A Thesis

Submitted in Partial Fulfillment for
the Requirements of Degree of Master of
Science in Microbiology

By

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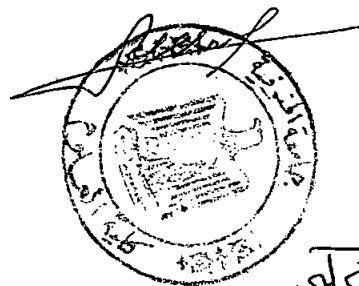
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Dedicate this thesis to my parents

ABSTRACT

Seven fungal species were isolated from two uranium ore samples taken from the Alloga region, South Western Sinai, Egypt. They were identified as *Aspergillus flavus*, *Penicillium brevicompactum*, *P. oxalicum*, *P. purpurescens*, *P. lividum*, *A. terreus* and *P. spinulosum*. They were tested for their bioleaching activity of uranium from the studied ore materials. *A. terreus* and *P. spinulosum* showed a high leaching activity. The amount of uranium solubilized by *A. terreus* and *P. spinulosum* was increased with increasing the ore concentration in the growth media, reaching its maximum value at 4% (w/v) of the ore. Whereas, the highest percentage of uranium released by both fungi was obtained at 1% (w/v). At this concentration, the released uranium by *A. terreus* and *P. spinulosum* was 75 and 81.5 % for the ore OS₁ respectively, and 72.8 and 77.6% for OS₂ respectively. The best leaching occurred when the final pH was shifted toward acidity. Biosorption of the released uranium by the fungal mycelium was also increased with increasing ore concentration in the growth media.

A. terreus and *P. spinulosum* secreted some organic acids such as ascorbic, nicotinic, malonic and citric acids. The amount of these organic acids decreased with increasing the ore concentrations. Oxalic acid was secreted only by *A. terreus* at an OS₁ 1% concentration of ore.

The optimum parameters for uranium solubilization by the two fungi were 30°C, 6 days of incubation, pH 4, sucrose as carbon source, NH₄Cl as the nitrogen source, 0.2 mm particle size and 1% ore concentration. The application of all of these optimum conditions for uranium solubilization by *A. terreus* and *P. spinulosum* was studied. *A. terreus* solubilized approximately 88.8 and 77.2% of the uranium found

in ores OS₁ and OS₂ respectively. Whereas, *P. spinulosum* showed higher solubilization, being 93.8 and 84.4% of the uranium found in OS₁ and OS₂ respectively.

Solubilization of metal oxides in the growth media by *A. terreus* and *P. spinulosum* increased with increasing ore concentrations. These metals are Si, Al, Mg, Mn and Na. Whereas, Fe ions solubilization decreased with increasing ore concentration.

A. terreus and *P. spinulosum* secreted some proteins in the culture filtrate. The amount of these proteins decreased with increasing ore concentrations in the growth media. The highest amount of these proteins were found at the 1% concentration of the ore and might aid in the solubilization process (since this concentration is the best one for solubilization of uranium).

Abiotic leaching of uranium utilizing some organic acids revealed that solubilization of uranium at an ore concentration of 1% was increased with increasing citric acid concentration reaching to 54 and 50% for the ores OS₁ and OS₂ respectively at 8% concentration of this acid, while at 8% concentration of ascorbic acid it reached approximately 34 and 31% from the two ores respectively. It was also observed that the percentage of uranium solubilization by both acids was decreased with increasing ore concentration in the solution.

The obtained results of this microbiological(fungal)leaching study of uranium from Alloga ferruginous siltstone was summarized an economic flowsheet.

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