



Ain Shams University
Faculty of Women for Arts,
Science and Education

Study on the Role of Some Microorganisms in the Biotransfer of Radionuclides in Different Rock Samples from Sinai, Egypt.

A Thesis

Submitted in Partial Fulfillment of the Requirements for

The Degree of

Doctor of Philosophy in Science

in

Microbiology

by

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Dedication

I would like to dedicate this work to my wonderful mother Soaad, my great father Mohamed, my dear husband Moustafa, my lovely daughters Fatma and Asya, my brothers, my sisters, my nieces and my friends and also to express my sincere and deepest thanks to them for putting up with me and for their great help and support all the time.

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List of Abbreviations

$(\text{U,Ca,Ce})(\text{Ti,Fe})\text{O}_6$	Brannerite
μm	Micrometer
API	Acid production index
ATCC	American Type Culture Collection
ATSDR	Agency for Toxic Substances and Disease Registry
BIM	Biologically induced mineralization
$\text{Ca}(\text{UO}_2)_2(\text{PO}_4)_2$	Autunite
calcite	Calcium carbonate
CFU	Colony forming units
DNA	Deoxyribonucleic acid
ENRRA	Egyptian Nuclear and Radiological Regulatory Authority
EPA	Environmental Protection Agency
EPS	Extracellular polymeric substances
F	Forward
FAA	Flame Atomic Absorption
H_2O_2	Hydrogen peroxide
H_3PO_4	Orthophosphoric acid
HPGe	High Purity Germanium

IAEA	International Atomic Energy Agency
ICP-MS	Inductively coupled plasma mass spectrometry
ICP-OES	Inductively Coupled Plasma Optical Emission Spectrometry
ISP	International <i>Streptomyces</i> Project
ISP6	Peptone yeast extract iron medium
ISP7	Tyrosine agar medium
ISP9	Carbon utilization agar medium
ITS	Internal transcribed spacer
KeV	Kilo electronvolt
LB	Luria-Bertani
LOI	loss-on-ignition
LSD	Least Significant Difference
Me	Metal
mg	Milligram
MICP	Microbially-induced calcium carbonate precipitation
mm	Millimeter
MSM	Molasses-salt medium
NCBI	National Center for Biotechnology Information

NFS	Nuclear field shift
$\text{NH}_4[\text{Fe}(\text{H}_2\text{O})_6](\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$	Ammonium ferrous sulphate
NH_4VO_3	Ammonium metavanadate
NMA	Nuclear Material Authority
NNRL	Northern Regional Research Laboratory
OC	Organic carbon
OM	Organic matter
PCSs	Phytochelatin synthases
PDA	Potato dextrose agar
PLFA	Phospholipid fatty acid
ppm	Part per million
PSI	Phosphate solubilization index
R	Reverse
r	Pearson coefficient
RfD	Reference Dose
rpm	Round per minute
rRNA	Ribosomal ribonucleic acid
S–L	Solid-liquid
SRB	Sulfate-reducing bacteria