Faculty of Science
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Biodegradation of Petroleum Oil by Certain Bacterial Strains

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Thesis

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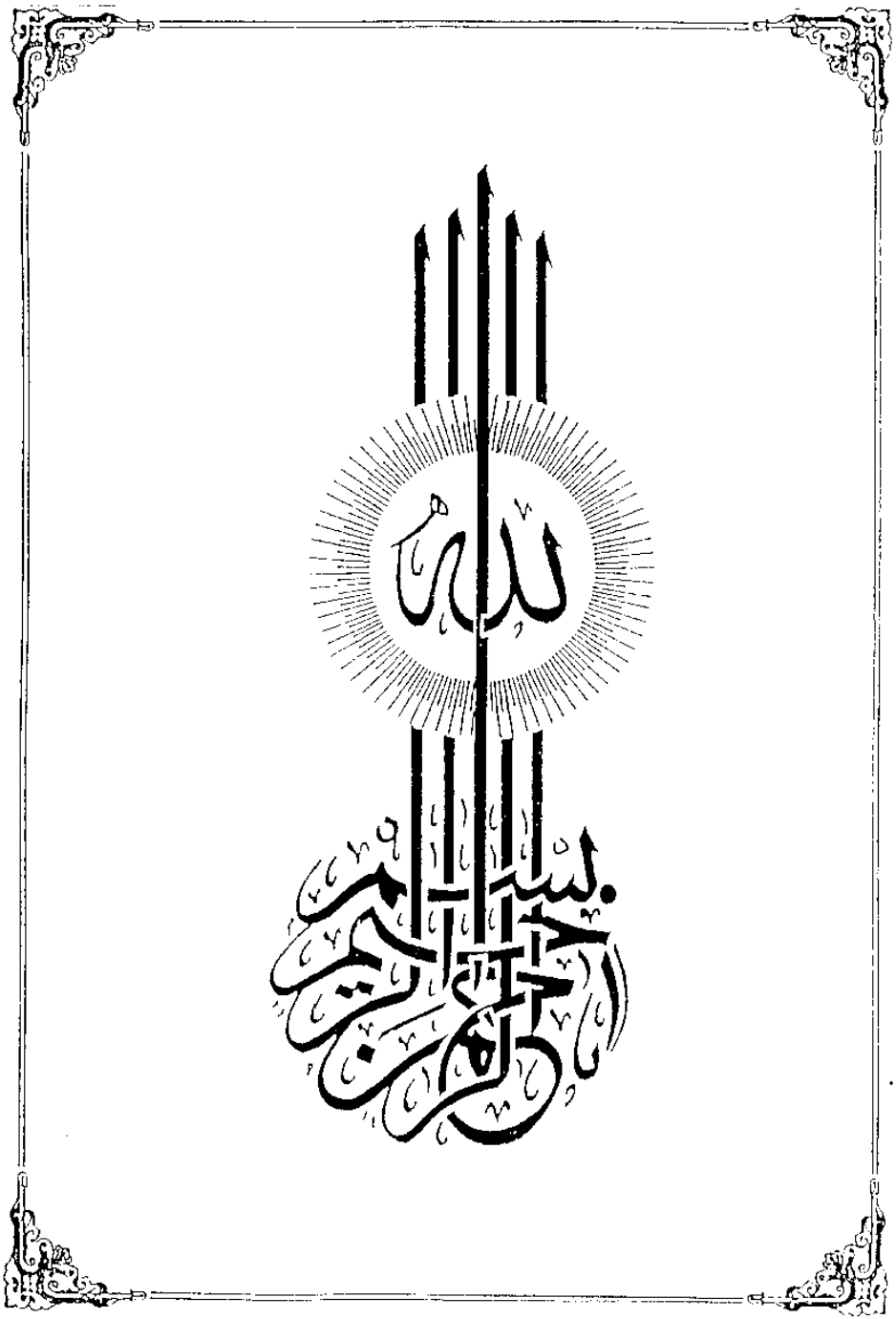

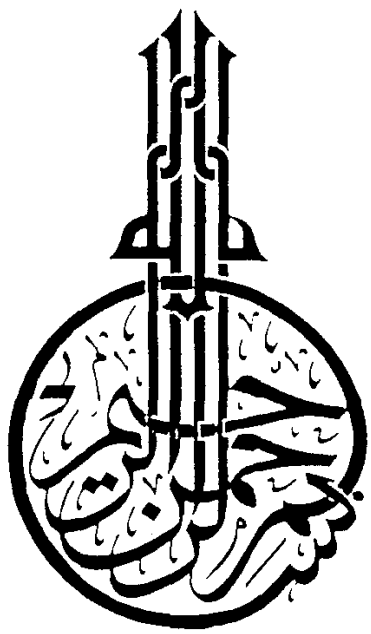

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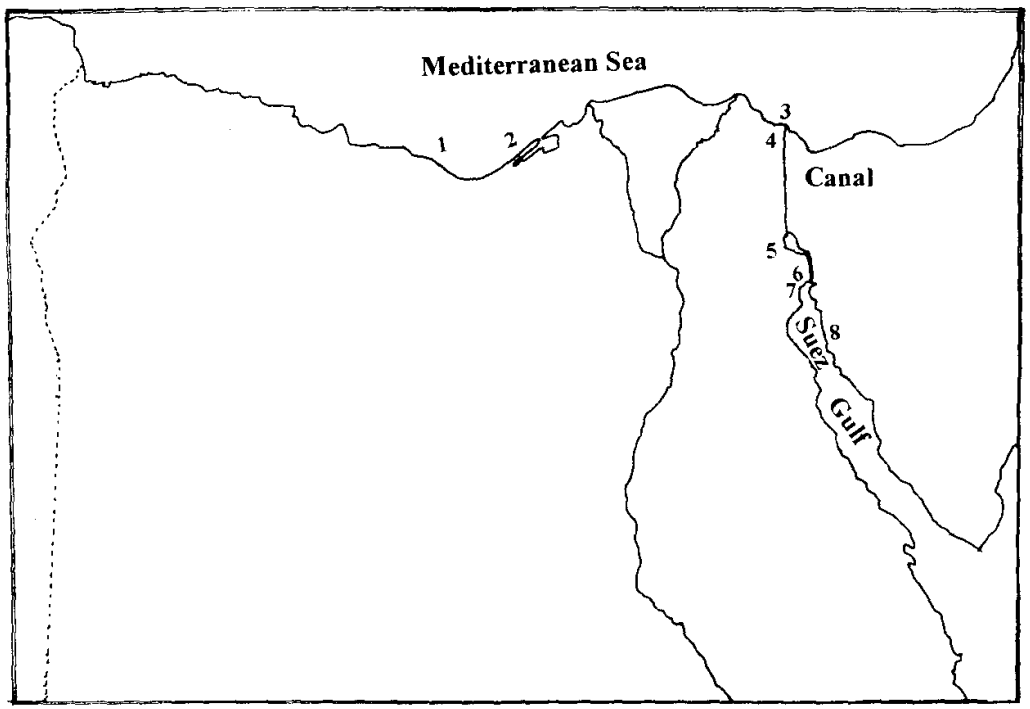
Abeer Enam

To Peace, Beauty and Purity

To Omar



A map illustrating the marine stations of samples collection.

Ph.D. Thesis

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Praperd by : Abeer Emam Mohamed Zakaria

- The Study was carried out in National Center for Radiation Research and Technology (Egypt).
- Sumbitted to Microbiology Dept., Fac. of Science, Ain Shams University.

ABSTRACT

Balaeam base oil was chosen as a model oil in the present study through which some abiotic treatments were implemented aiming at attenuating its naphthenic and aromatic contents; such as the adsorptive technique and the gamma-irradiation technique. In an attempt to apply the biodegrading bacteria as oil pollutant bioindicators upon coastal water samples, a cerrelation between hydrocarbon concentration and the relative enumeration of the bacterial oil degraders was detected for some litteral locations along the Mediterranean Sea shore west and east Delta, Suez Canal and Suez Gulf.

24 petroleum utilizing bacterial isolates were isolated from El-Zayteia Port (Suez) and identified by morphological, physiological and environemental examination. The biodegradation capacity of the isolates towards the chosen model oil and its separate components was studied in comparison with the standard isolate *Pseudomonas aeruginosa*. Furtherly, the role of the bacterial plasmids taking part in the biodegradation process was investigated as well.

On the basis of the previously mentioned aspects, some oil spill biodegradation agents were subjected to examining their attrition capacity of oil pollution within microcosms of 5000 ppm base oil. Gas chromatographic, Ultraviolet and gravimetic analytical techniques were implied in this respect.

Additonally, some activating factors were also taken in consideration to induce efficient biodegradation of hydrocarbons, such as chemical dispresent, oil concentration, hydrocarbon composition, temperature, aeration, nutrients, pH and the intial count of petroleum utilizers. FT-IR and

gravimetric techniques were implemented in following up the impact of these factors on the efficacy of the biodegradation process.

Key words : Biodegradation - Petroleum-Hydrocarbon - Irradiation - Bioremediation - Bioindicator- Plasmid - EL-Zayteia Port-Suez Gulf - Marine.