



Accredited Faculty

**“Ecological studies on some wild economic plants of the
Mediterranean coastal area along the international road - west
Alexandria – Egypt”**

A Thesis submitted to

*Faculty of Science, Ain Shams University for the degree of Doctor of Philosophy of Science in
Botany*

By

Oday Neama Najm Al-hadithy

—◁ B.Sc. 2000 ▷—

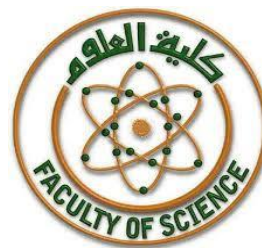
—◁ M.Sc. 2015 ▷—

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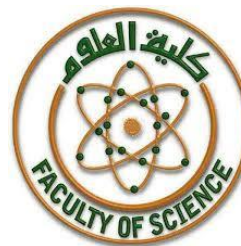
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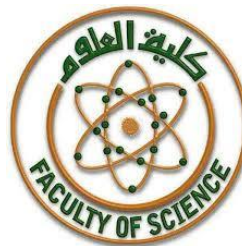
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This thesis has not been previously submitted for any degree at this or any other University and it is the original work of the author

Oday Neama Najm Al-hadithy

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This work is dedicated to:

My Dear Father

My Dear Mother

My Wife

My Sons

My Brother

My Sisters

With My Love and Respect

Oday Neama Najm Al-hadithy

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ABSTRACT

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The present study aimed to characterize the ecological features of the vegetation along the international coastal road from El-Ajami to Ras El-Hekma, West Alexandria and evaluation of the economic potentialities of some selected plant species. The cluster analysis of 60 stands was performed using the Community Analysis Package program and Detrended Correspondence Analysis (DCA). Canonical Correspondence Analysis (CCA) was used to identify the ecological relationships between the vegetation and the environment along the roadside. The total number of the recorded plant species surveyed in the present study was 84 species belonging to 74 genera and related to 25 families. Asteraceae, Poaceae, Fabaceae, and Chenopodiaceae were the largest families (53.57% of the total species, collectively). Therophytes is the most abundant life forms. Mediterranean chorotype (58.32%) was the most represented. On the basis of the presence values, cluster analysis yielded four vegetation groups. Group A was dominated by *Carthamus tenuis*, group B by *Lactuca serriola*, group C by *Bromus diandrus* and group D by *Suaeda pruinosa*. The application of CCA showed that the percentages of porosity, organic carbon, CaCO₃, Cl⁻, SO₄²⁻, HCO₃⁻ and cations are the most effective soil variables.

The economic potentialities of ten species (*Achellia santolina*, *Atriplex halimus*, *Atriplex semibaccata*, *Cynanchum acutum*, *Emex spinose*, *Halocnemum strobilaceum*, *Lycium shawii* Roem, *Pancratium maritimum*, *Reichardia tingitana* and *Suaeda pruinosa*) which are growing in the study area have been studied. The DPPH free radical scavenging activity of the studied plant extract were estimated, *A. halimus* showed the highest antioxidant activity with IC₅₀ value of (0.161 mg/ml), while the lowest antioxidant activity was obtained from *H. strobilaceum* with IC₅₀ value (1.351 mg/ml). All studied plant species extracts show different inhibition zone against same selected bacterial strains, On the other hand, all the studied plant species are also showed different inhibition zones against fungal strains.

Keywords: Roadside vegetation; coastal vegetation; multivariate analysis; soil-vegetation relationship; Phytochemical; Antimicrobial; GC/MS

INTRODUCTION

The coastlines of Egypt extend for more than 3,500 km along the Mediterranean Sea, the Red Sea and south Sinai. The Mediterranean coastal land of Egypt has a narrow coastal belt stretching between Sallum (on the Libyan borders) eastward to Rafah (on the Palestinian borders) for about 970 km, with a normal width ranging between 20- 25 km in the north–southern direction (**Zahrán and Willis, 2009**). The coastal areas of Egypt suffer from a number of serious problems including: unplanned development, land subsidence, excessive erosion rates, water logging, salt water intrusion, soil salinization and ecosystem degradation. Nowadays, Egyptian deserts, particularly the Mediterranean coastal strip, provide a clear example of anthropogenic disturbance that had resulted in habitat loss and fragmentation leading to diminishing of the germplasm reservoir (**Ayyad & Le Floch, 1983; El-Sadek & Ayyad 2000**). An international road connecting the most eastern and western towns in Egypt was constructed parallel towards the Northern coast (**El Raey, 1997; Eid & El-Marsafawy, 2002; Taha & El-Asmar, 2018**).

Egypt has a total area of about 1 million km², with a terrain that is basically a vast desert plateau interrupted by the Nile Valley and Delta. Most of the agricultural land is located close to the banks of the Nile River and in the Nile Delta, with a total area of 34000 km², or 3.3% of the total area of the country and almost all of it is irrigated (**Alfiky *et al.*, 2012; FAO, 2010 and Moustafa *et al.*, 2018**). The western desert of Egypt occupies the west side of the river Nile. It extends from the Mediterranean coast in the north to the Egyptian-Sudanian border in the south (about 1073 km), and from the Nile valley in the east to the Egyptian-Libyan border in the west, a width between