Diagnostic study of soil fungi in Salah al-Din Governorate

Mohammed Salman Dalas[1], Ahmed J.M. Al-Taywi[2], Huda damin Abdul jabbar[3], Ayat Ali Saleh[4]
[1] Anesthesia Department, Al-Qalam University College/Iraq
[2,3,4] Department of Biology, College of Education for Pure Sciences, Tikrit University, Iraq
Email: Mohammed@alqalam.edu.iq

Abstract
This study was conducted in the laboratories of department of biology, college of education for pure sciences, in which four species of fungi were isolated from soils of different textures taken from different regions of Salah al-Din Governorate (Al-Alam, Shirqat, Dujail, Balad and Tikrit), as well as soils contaminated with crude oil from Qayyarah district. Fungi have been diagnosed in different types of soil, namely, the soil (garden soil - white soil - red soil - green soil - sandy soil - oil-contaminated soil). The following races have been obtained Aspergillus terrus , Aspergillus niger , Rhizopus , Alternaria, where the fungus niger was isolated. A of several types of soil, including red, black, sandy and day soils from Tikrit, Balad and Al-Alam districts. As for the fungus Rhizopus, it was identified from soil samples taken from the garden soil in the department of biology and the soils of fields in the regions of Balad, Tikrit, Dujail and Al-Alam. In the red soil of Dujail district, the fungus Alternaria was isolated. Samples of the fungus Aspergillus terrus were obtained in sandy soils taken from Al-Alam and Al-Sharqat area. As for the soils contaminated with crude oil from Qayyarah district, no fungi were diagnosed.
Keywords: Fungi; diagnostic; environmental factors; soil.

1. Introduction

Soil is the basic incubator for most types of living organisms that live on or within it, whether they are animals or plants. Among the weather conditions, in addition to forming a vital incubator for millions of species of microorganisms and worms that contribute to the decomposition of corpses and waste and the disposal of the environment from them (Al-Khafaji, 2020).
Soil fungi are the beginning of the soil food web that helps other soil organisms and supports healthy soil functions. They are microscopic plant-like cells that may be unicellular, or grow in the form of long, thread-like structures, and they do not depend on certain types of plants. It is also slow growing. These fungi prefer an acidic environment, perennial plants, slow recycling time, highly stable forms of organic residues containing high values of carbon and nitrogen, and internal nutrient sources directly from the plant 460 million years ago. Some species of soil fungi built a symbiotic relationship with plants. These fungi provide several benefits to the soil, the most important of which is obtaining nutrients: Soil fungi help plants obtain various nutrients such as: nitrogen, zinc, calcium, iron, potassium, copper, phosphorous, and magnesium. Protection from disease: Fungi protect the roots from pathogens, and provide them with antibiotics also forming fertile soil. Formation of soil that allows the movement of water, air, microbes, nutrients, and organic matter through it. Resisting drought (Al-Rakabi and his group, 2011).
Fungi activate the cells responsible for absorbing and transporting water, which contributes to plant hydration. In times of drought, these fungi work to maintain physiological activity in the plant cell such as photosynthesis (Ishikawa, 1992).

2. Materials and Methods

Collecting soil samples: Soil samples were collected from different places in Salah al-Din Governorate (Al-Alam, Shirqat, Dujail, Balad and Tikrit). Soil samples were also taken from Al-Kayara district in Nineveh Governorate. Also, samples were taken from the garden of the department of biology, college of education for pure sciences, Tikrit University.
The samples collected previously are five types (garden soil - white soil - red soil - green soil - sandy soil - oil contaminated soil).
(100-50 g) of soil was taken after lifting the top layer and excavation was done about 15-10 cm and samples were taken. The samples were placed in a clean plastic container. The details of each type of soil were written on a tape. Fungi cultivation and diagnosis.
Cultivation of soil fungi: There are two ways to grow fungi: First: - The direct method, which we will discuss in the cultivation of agricultural media, and the method is to take small parts of the soil samples to be planted and distributed on Petri dishes containing the nutrient media, and then placed in the incubator at a temperature of (25 degrees Celsius) for five days for the purpose of the growth of fungi (American Public Health, 1978; Forbes et al, 2002).
Second: The indirect method of plate dilution: This method is widely used in quantitative studies of soil microorganisms because it may be difficult to analyze the results in a fair analysis, as the fungi reproduce in a different way and in varying numbers, it is, however, considered a good method for studying the fungi that produce spores (Hoppe et al., 1997).

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Preparation of the PDA culture medium

(19) g of PDA culture medium is weighed according to the company that supplied the medium and placed in a glass beaker with a capacity of (500 ml), then distilled water is placed in the glass beaker and we also add half a capsule of chlorampheincol, which does not allow bacteria to grow in the culture medium (Smith and Dawson , 1944), the dishes were incubated for seven days at a temperature of 370, then the samples were transferred in preparation for their diagnosis on the electron microscope (Sutton and his group, 1998).

Environmental conditions affecting the growth of fungi: Salt effect, pH, temperature. We were unable to complete it due to the ban and work cuts.

Materials used

1- PDA culture medium
2- Methyl blue dye
3- transparent sticker
4- cotton
5- Aluminum is a heat insulator
6- chloramphenicol capsule
7- Distilled water
8- 500ml glass beaker
9- Bunsen lamp
10- Lobe

Equipment used:

1- Electron microscope
2- electric oscillator
3- Incubator
4- planting cabin

3. Results and Discussion

Fungi isolated from the soil: the following fungi have been isolated

Aspergillus terrus, Aspergillus niger , Rhizopus , Alternaria

Where isolate the fungus niger. A from several types of soil, including red, black, sandy and clay soils from Tikrit, Balad and Al-Alam districts, and (7) isolates of niger fungus were obtained, as it is considered a saprophytic fungus with a wide spread in different soils, as it has the ability to withstand drought and a wide range of tensile The moisture (abd al hussain 2001).

Niger. A

As (Abd-Al Hussain, 2001) was able to isolate the fungus conidia even from layers of soil where temperatures reach the point of freezing. In addition, it was found that the spores of the fungus niger.A have the ability to withstand high temperatures up to 50 °C (Baink et al. , 1982).

In a study of (1981 Abdel Hafez,) about the salt-tolerant fungi in desert soils, it was found that the most tolerant species were of them.

Aspergillus niger, which indicates its ability to tolerate drought and the ability to grow in soils poor in organic matter.

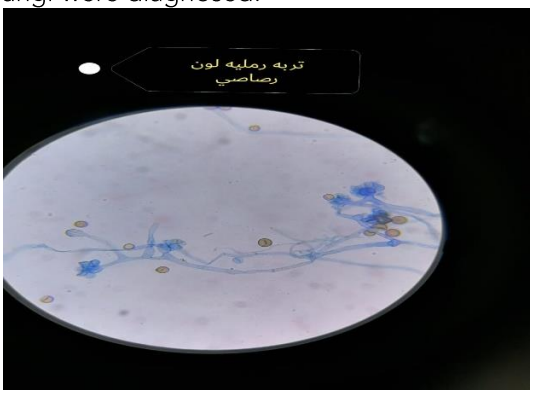
While one species belonging to the genus Alternaria was isolated from the red soil from Dujail district.

Alternaria

Samples of the fungus Aspergillus terrus were obtained in sandy soils taken from the Al-Alam and Shirqat area, and this was stated (Al-Rikabi, 2011).

Aspergillus terrus

As for the fungus of the genus Rhizopus, it was obtained from soil samples taken from garden soil in the department of biology and field soils in the regions of Balad, Tikrit, Dujail and Al-Alam because they often live in environmental environments rich in dissolved organic matter or on the dung of animals and dead animal tissues (Cook, 2018). As for the soils contaminated with crude oil from Qayyarah district, no fungi were diagnosed.



Rhizopus

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