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Isolation and identification of fungai and count bacteria in soil

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Introduction

Soil fungi

Soil fungus is the beginning of a soil food network that helps other living organisms in the soil and supports healthy soil functions. They are cells that resemble microscopic plants. They may be single cells or grow in long, stringy structures. They do not depend on certain types of plants, As they are slow to grow, these fungi prefer acidic environment, perennial plants, slow recycling time, high stability forms of organic residues containing high values of carbon and nitrogen, and direct nutrient sources directly from the plant.

Benefits of soil fungus

Some 460 million years ago, some species of soil fungus have developed a symbiotic relationship with plants.
These fungi offer several benefits to soil:
Get nutrients:
Soil fungus helps plants acquire various nutrients such as: nitrogen, zinc, calcium, iron, potassium, copper, phosphorus, and magnesium.
Protection against disease:
Fungi protects the roots from pathogens, and also provides them with antibiotics.

Formation of fertile soil

Soil fungi help form soil that allows the movement of water, air, microbes, nutrients and organic matter through them.
Drought resistance:
The fungus activates the cells responsible for the absorption and transport of water, which contributes to moisturizing the plant, and in times of drought, these fungi to maintain the physiological activity in the plant cell such as photosynthesis.

Types of Soil fungi

Soil fungus is divided into three groups depending on how they obtain energy:
Analyzers: are fungus that converts dead organic matter into innate biomass, small particles, and carbon dioxide.
Takaful is the fungus that provides plant nutrients in exchange for carbon.
Insecticide: A fungus that causes illness or death of plants.

Mycorrhizal Fungi in Agriculture

Mycorrhiza is a symbiotic association between fungi and plant roots and is unlike either fungi or roots alone. Most trees and agricultural crops depend on or benefit substantially from mycorrhizae. The exceptions are many members of the Cruciferae family (e.g., broccoli, mustard), and the Chenopodiaceae family (e.g. lambsquarters, spinach, beets), which do not form mycorrhizal associations. The level of dependency on mycorrhizae varies greatly among varieties of some crops, including wheat and corn.

Land management practices affect the formation of mycorrhizae. The number of mycorrhizal fungi in soil will decline in fallowed fields or in those planted to crops that do not form mycorrhizae. Frequent tillage may reduce mycorrhizal associations, and broad spectrum fungicides are toxic to mycorrhizal fungi. Very high levels of nitrogen or phosphorus fertilizer may reduce inoculation of roots. Some inoculums of mycorrhizal fungi are commercially available and can be added to the soil at planting time.

Aim and objectives

The aim of this research is to identify some types of fungi found in three types of soil (soil under cultivation - soil by the road - soil near the farm) and at different depths

(0-5 cm,5-10 cm,10-15 cm)

- counting the bacteria in different soils

- Identification of pH of soil samples on which microbes have grown

Materials and methods

Materials :-

1- Media culture

- Corn meal Agar

- Malt extract Agar

- Yeast extract Agar

- Potato dextrose Agar

- Czapecdox Agar

- Nautrient Agar

2- Distilled water to prepare media

3- Balance to weigh media and soil

4- Graduated cylinder

5- Autoclave to stralization media and tools

6- Alcohol to sterilization for bench

7- Incubatorfor fungi (25°C) – for bacteria (37°C)

8- flasks 9-petri dishes 10- needle 11-loop 12- test tube

13-Microscope 14-methylen blue 15-pipet 16- PH meter

17-Microscope slide

- Collection of samples

- Soil samples were collected from three different places (soil under cultivation – soil on the road – soil near the farm) and with different depths (0-5 cm, 5-10 cm, 10-15 cm). So we had 9 soil samples, we collected each sample with a plastic bag.

Fungi examination:-

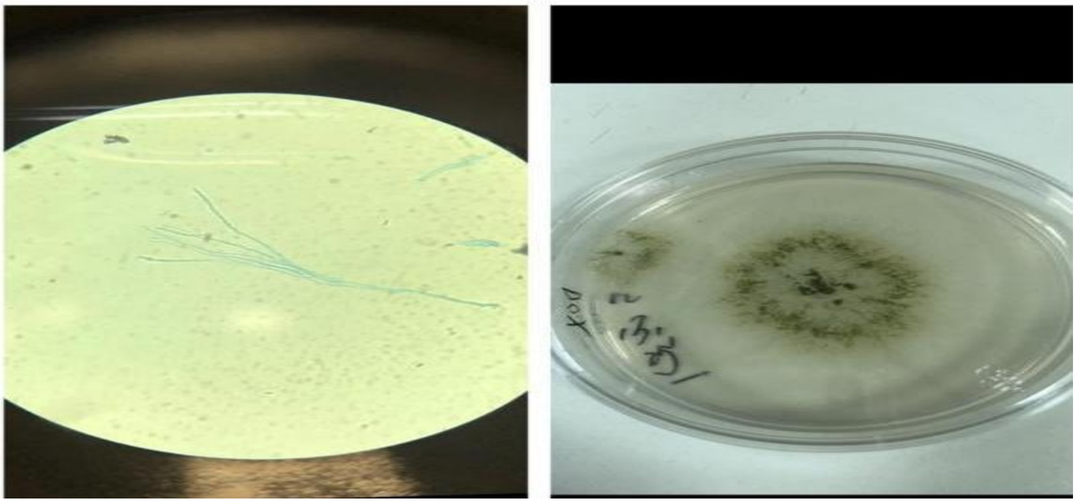
- We prepare the media and pour it into the petri dishes
- Then sprinkle a small amount of soil on fungal media
- put them in the fungus incubator for 1 week
- After a week the fungus has grown and we took a pure colony and then planted it in the Petri dishes and the same media on which it grew
- After a week of incubation we examined the pure colonies on the microscope

Count bacteria in samples:-

- Put 9 ml of distilled water into six tubes so that the dilution is one of a million
- Weigh one specimen from the sample and put it in the first tube. Then we take one milliliter From the first tube and put it in the second tube. We do this method up to the sixth tube and The dilution is one in one million
- Take one milli of each dilution and put each dilution in a Petri dish containing the nautrient agar media
- We incubate samples at 37 ° C for 2 days
- After two days of incubation we count the colonies

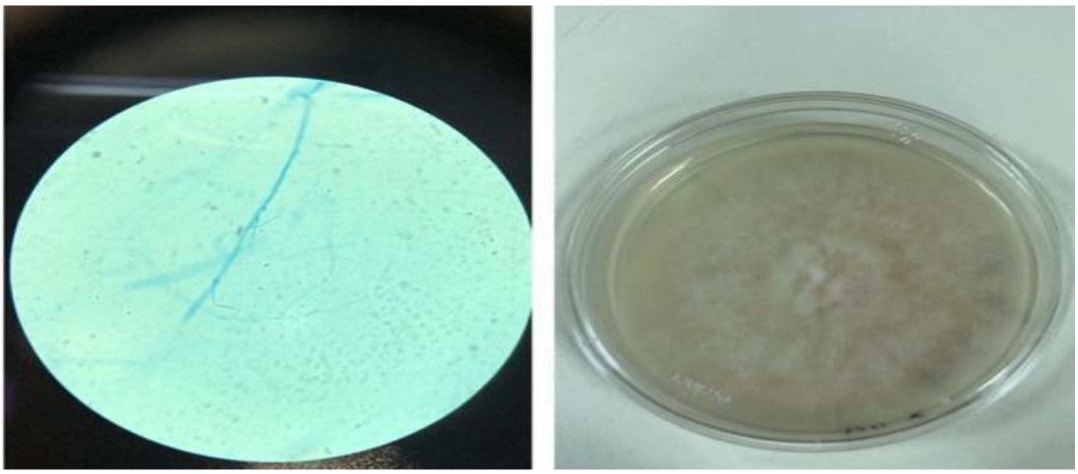
Results and Discussion

These are some of the fungi that we have defined :-



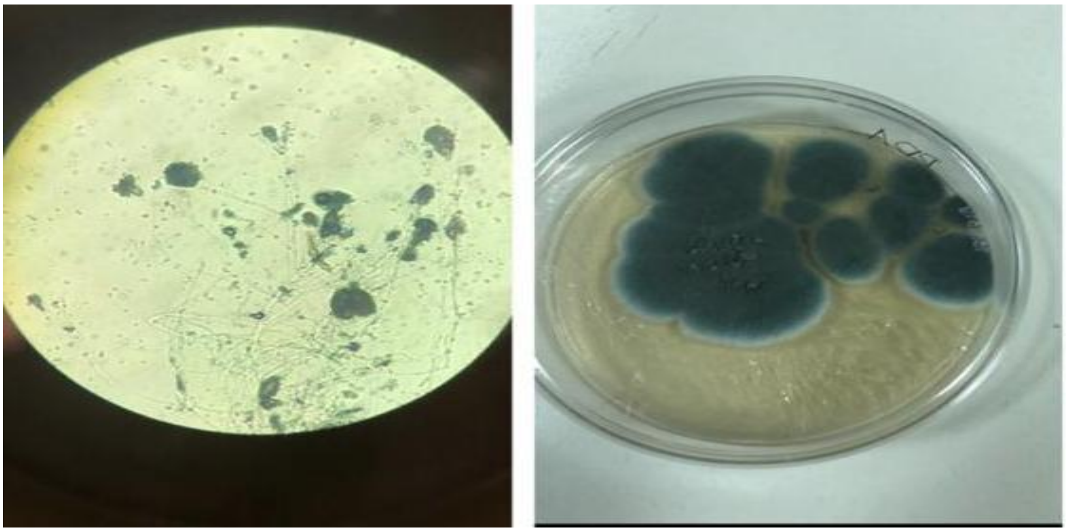
The media: Czapecdox Agar - soil on the road – 0-5cm

Aspergillus *sp*



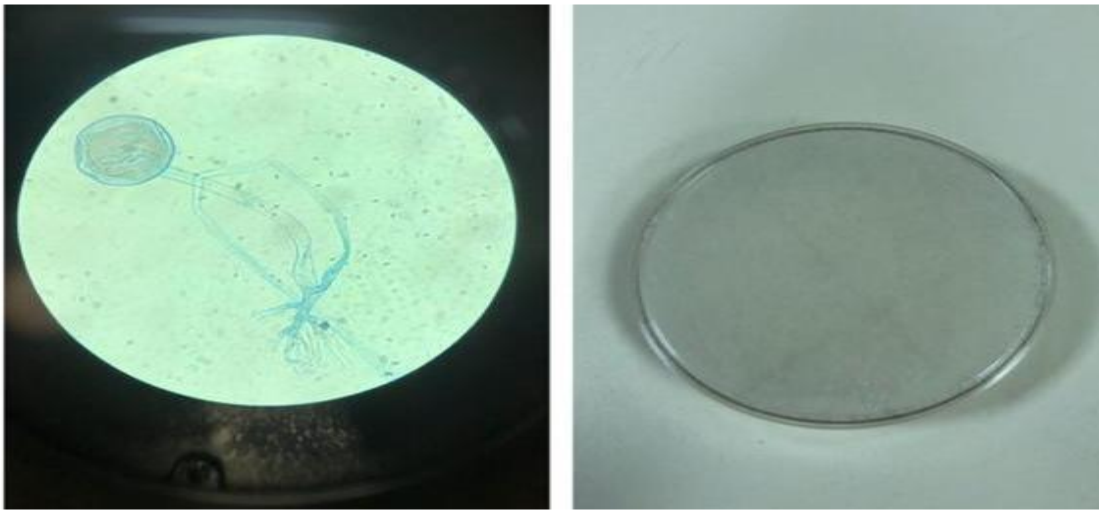
The media: Corn meal Agar - soil on the road – 0-5cm

Fusarium *sp.*



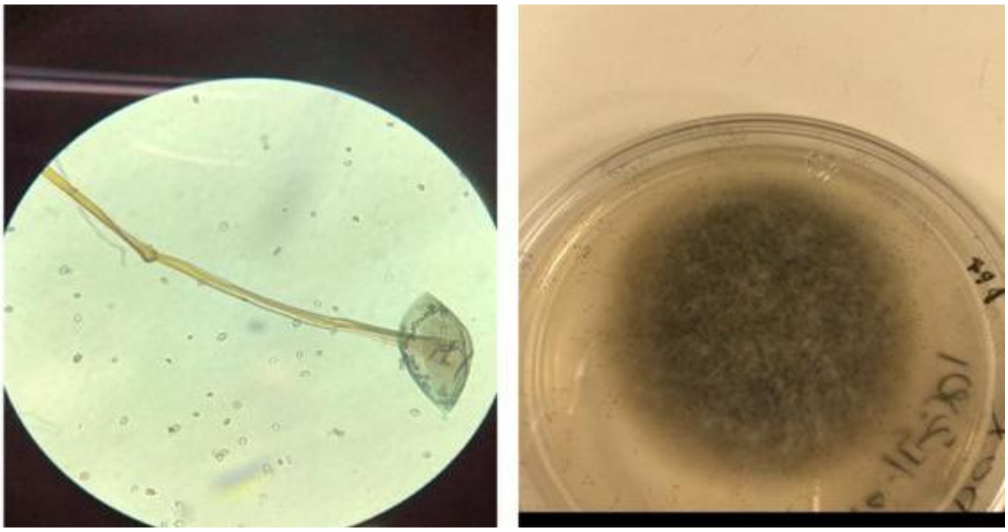
The media: Potato dextrose Agar- soil on the road– 0-5cm

.*Penicillium* sp



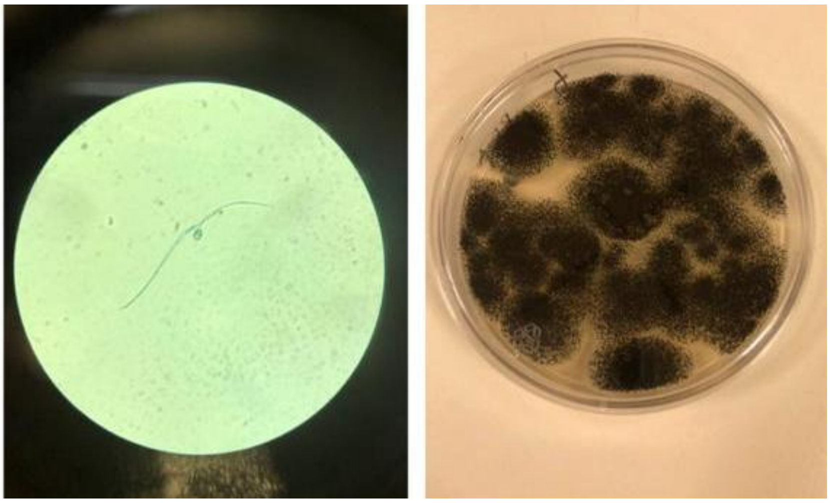
The media: Malt extract Agar - soil on the road – 0-5cm

Rhizopus sp



The media: : Czapecdox Agar - soil on the road– 10-15cm

Mucor sp.



The media: **Potato dextrose Agar**- soil near the farm– 5-10cm

Aspergillus niger

Road soil was the most diverse of fungus

And either counting bacteria It was as follows:-

soil under cultivation

Dilutions	15-10	10-5	5-0
1/10	over	over	over
1/100	390	328	354
1/1000	105	84	95
1/10000	84	72	68
1/100000	63	43	15
1/1000000	46	31	4

soil near the farm

Dilutions	15-10	10-5	5-0
1/10	over	over	over
1/100	398	339	363
1/1000	108	94	159
1/10000	84	77	101
1/100000	46	52	42
1/1000000	22	34	30

soil on the road

Dilutions	15-10	10-5	5-0
1/10	274	297	308
1/100	117	121	129
1/1000	88	77	71
1/10000	53	41	34
1/100000	23	17	11
1/1000000	20	7	4

The lowest number of bacteria was in the soil of the road

Soil PH:-

- soil under cultivation

0-5cm (7,55)

5-10cm(7,31)

10-15cm(7,13)

- soil near the farm:-

0-5cm(7,11)

5-10cm(6,88)

10,15cm(6,69)

- soil by the road:-

0-5cm(6,87)

5-10cm(6,62)

10,15cm(6,39)

Conclusion

The fungi were more diverse in the soil of the road, and bacteria were more numerous in soil under cultivation.

Road soil was the most acidic and the most basic were.

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