Lab 8 Soil Microbiology

The role of soil microorganisms in changes elements

Carbon cycle

Elements such as carbon, nitrogen and oxygen at different rates are Compose contents cells of living organisms (animal, plant, microorganisms) and these elements exist in the environment in the form of free molecules or atoms in organic compounds and organic.

Microorganisms possess many enzymatic systems (natural or stimulating) decomposition of complex compounds to simple exploited by other organisms and products are needed to feed the growth of these organisms and these events check the status of life in the balance of nature.

Summed up the carbon cycle converts carbon not organic to the Carbon Organic by plants and green algae and autotrophic bacteria through photosynthesis process for making what they need in the growth of food process turns organic carbon from plant to animal by feeding the animal on plants, when animals and plants died the microscopic organism analysis of residues in the soil and then launch carbon dioxide again and through breathing.

Degradation of Cellulose

Degrades cellulose by microorganisms may take one of two way:either fully analyzed and the resulting sugar glucose, which is used source of carbon and energy in this case has a microbiology system enzymatically complete as what is shown in the following equation:

$$\text{Cellulose} \xrightarrow{\text{Cellulose}} \text{Cellobiose} \xrightarrow[\text{B-glucosidase}]{\text{Cellobiase}} \text{glucose}$$

Or that some microorganisms do not have the full system as result of cellobiose.

Procedure :

1. Weigh (1) g of soil sample under study and added to the tube container on the media specialized to isolating bacteria that decomposing cellulose (Doubose cellulose media) with a filter papers as the source of carbon (and cellulose) in

the middle (paraffin wax is placed to isolate anaerobic bacteria decomposing cellulose).

2. Incubated tubes at 28 C for one to four weeks.
3. Examine the set of filter papers in the test every week until the Appearance of disintegration that have a shot holes as well as the appearance of yellow spots on the filter papers which indicates the decomposition of cellulose.
4. Make suspended by cut piece of filter paper and put in clean petri dish with some of D.W and then work tinge on a clean glass slide, and leave it to dry and then pigmentation with dye carbon fuxin then washed with water and leave to dry and examined under a microscope.

Bacterial cellulose decomposing :

Bacillus sp. → Spore forming G+ , *Clostridium sp.* G+

Pseudomonas sp. → G- عصيات مفردة

Cytophage sp. → G- مغزلية الشكل

Molds & Fungi of cellulose decomposing:

Aspergillus sp. Penicillium sp. Fusarium sp. Trichoderma sp.

Filamentous bacteria from cellulose decomposing:

Micromonospora sp. Nocardia sp. Streptomyces sp.

Degradation of pectin

Pectin found in the Middle lamella in the cells of plants and some algae, associated with calcium carbonate, which gives plant cells mainstay constant. Some microorganisms analysis of pectin such as bacteria *Erwinia carotovora* and mold species belonging to the genus *Fusarium* sp.

Microorganisms excreted enzyme analyst pectin(Pectinase) which analyzes the pectin and thus lose the plant cell-strong hardness.

Procedure :

1. works soil suspension by adding (1) g of soil to test tube container to (9) ml of sterile distilled water.

2. Cut potato tubers and pollinate their surfaces amount of soil stuck, placed in sterile glass dishes.
3. Add the amount of sterile water to the dishes during the incubation to avoid drying happen.
4. Note Maceration phenomenon (the following week) to the potatoes because of the decomposition of middle lamella between plant cells because most of the installation of the walls is composed of pectin.

Degradation of starch

Starch degrades by microorganisms to bilateral and unilateral sugars (glucose), which has analyzed the starch enzymes such as amylase (α- , β -amylase and Isoamylase) these enzymes affect the bonds of sugar units consisting of starch .

Procedure :

1. works soil suspension by adding (1) g of soil to test tube container to (9) ml of sterile distilled water.
2. Use media (Starch agar) and pour in sterile glass dishes (use this medium to isolate the bacteria analyzed for starch).
3. Add 0.1 ml of selected diluted to the medium surface after it is published on the middle surface using a sterile glass publisher.
4. Incubated at a temperature of 28 C for a week.
5. Observed growth on the surface of the dish and to identify the bacteria analyzed for starch add to one of the dishes drops of iodine solution after two minutes note the presence of a halo transparent Clear zone around the colonies evidence of the production of enzymes, either areas distant from the colonies made up the blue color as a result of iodine interaction with starch .
6. Work swabs of growth and examined under a microscope to identify the microbiology analyst for starch.

Bacteria : *Bacillus sp. Clostridium sp. Micrococcus sp.*

Molds & Fungi : *Aspergillus sp. Rhizopus sp. Fusarium sp.*