Practical Ecotoxicology
Biology Department/3rd stage
Lab-7-

اعداد

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Algal toxins & Mycotoxins

Algal toxins :

Some types of algae or moss produce certain chemical compounds as secondary metabolite products called toxins or poisons, and this algae is blue-green algae or cyanobacteria, as well as some types of dinoflagellata.

Saxitoxin:

Is the one of the most toxic compounds of Dinoflagellata. It stimulate the production of this poison compound during the growth of algae in the high levels of salinity.

Note:

The toxin of blue –green algae consist of alkaloids or peptides, as the toxins consisting of alkaloids works faster than peptides because it attacks the muscular nervous system directly, and they cause paralysis of the respiratory structural muscle and cause death by paralysis of the respiratory tract in within to 2 hours.

The toxins divided in blue-green algae into groups on the basis of Kinds of impact or Damage caused to:

A- Heptatoxins such as:

1- Microcystin and **Cyanoginosin** produced by ***Microcystis***.

2- Nodularin produced by ***Nodularia***.

B- Neurotoxins such as:

1- Anatoxin produced by ***Anabaena*** .

2- Aphantoxin produced by ***Aphanizomenon***.

3- Homoanatoxin produced by ***Oscillatoria***.

C- Cytotoxins produced by ***Microcystis***.

D- Dermatotoxins produced by ***Oscillatoria***.

Factors that affect on the production of algal toxins:

Chemical agents:

- Such as treatment with chlorine or some chemicals.
- Lack of phosphate leads to an increase in the production of toxins.

Physical factors:

- Made up of toxins under the influence of light.
- Temperature.

Biological agent:

- The nature of the algal cells.
- Genetic factors in the DNA.

A mycotoxin:

Is a toxic secondary metabolite produced by organisms of the Fungi group, commonly known as molds. One mold species may produce many different mycotoxins, and the same mycotoxin may be produced by several species.

Note:

- The production of mycotoxins depends on the surrounding intrinsic and extrinsic environments.
- The toxins vary greatly in their severity, depending on the organisms infected and its susceptibility, metabolism, and defense mechanisms.
- Some of the health effects found in animals and human include death, identifiable diseases or health problems, weakened immune systems without specificity to a toxin, and as allergens or irritants.

The major groups of mycotoxin are:

1- Aflatoxins produced by ***Aspergillus***.

2-Ochratoxins produced by ***Penicillium***.

3- **Zearalenone** produced by ***Fusarium***.

4- **Stratotoxin** produced by ***Stachybotrys***.

5- **Tertotoxin** produced by ***Alternaria***.

The most important characteristics of mycotoxins:

1- have a low molecular weight.

2- have the ability to reach the goal (impact area inside the body).

3- the speed of excretion through the digestive system is less than the speed of absorbed by the body.

4- its ability to accumulate in various tissues.

Methods of determining the presence of toxins:

Many methods have been used to monitor and determine the concentrations of these toxins, such as using chromatography, **HPLC** and **TLC**, and some ways immune such as **alaliza** where the toxin binds multiple antibody directed against the poison.

Questions