

# Interdependency between Plant and Animal is One of the Process of Bioremediation

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**Abstract** - In the proper balancing of environmental structure of earth the interrelationship between plant and animal is also a God gifted factor for balancing of environment and lives of plants and animals. During day times the plants take carbon dioxide for their nutritional requirements but during night times the plants take the oxygen for respiration. The animals does not take the carbon dioxide but during respiration animals release the carbon dioxide and take oxygen During day time the plants take carbon dioxide and release oxygen for photosynthesis and animals take oxygen and release carbon dioxide for respiration. The oxygen is also helpful in the increasing of immunity of animals to fight against the diseases. The immunity helps as source of Bioremediation.

**Keywords:** Biotic factors, Abiotic factors, Interrelationships, and Oxidation.

## I. Introduction

Bioremediation is the use of living organisms for removal of a pollutant from the biosphere. It relies on biological processes to minimize an unwanted environmental impact of the pollutants. The microorganisms, in particular have the abilities to degrade, detoxify and even accumulate the harmful organic as well as inorganic compounds. Beside them, higher plants have also been reported to remove such pollutants, primarily through their ability to accumulate these in their tissues.

Bioremediation has emerged during recent past as most ideal alternative, environment friendly and ecologically sound technology for removing pollutants from the environment, restoring contaminated sites, and preventing further pollution. Bioremediation in fact forms a vital Component of the so-called green movement of maintaining the nature's overall ecological balance, an issue of top priority of environmental awareness and public policy. Bioremediation is the alliance of a biological system and an engineering system for the remediation of undesirable chemical pollution.

The Planet Earth along with its living organisms and atmosphere (air, land, water) which sustains life is known as

the Biosphere. Biosphere extends vertically into the atmosphere to about 10 km, downward onto the ocean to depth of about 35,000 ft., and into about 23,000 ft of the earth surface itself where living organisms have been found. The different components of the biosphere interact in a delicately controlled and orderly manner and it is this factor that ensures the survival and growth of the biotic elements or living beings. Any adverse effect or disturbance of the 'delicate balance' of the biosphere, caused by man's careless or excessive exploitation of natural resources, can lead to the creation of unfavourable conditions for the well being or even survival of mankind, even though most organisms, including man, have some capacity to tolerate and adjust to reasonable measures of pollution, environmental stimuli, crowding and estrangement from natural biological cycles.

## II. Relationship between Plant and Animal

### 1. Photosynthesis:

Photo synthesis is the source of most of the energy in the biosphere and accounts for fixation of atmospheric carbon dioxide ( $\text{CO}_2$ ) and the production of most or all of the oxygen ( $\text{O}_2$ ) in the atmosphere. The whole process can be divided into light reaction and dark reactions. The light reactions use the energy of sunlight to extract electrons from water, producing oxygen ( $\text{O}_2$ ), reductive potential and a proton gradient that drives ATP formation. The dark reactions reduce carbon dioxide ( $\text{CO}_2$ ) into carbohydrates. In plants and higher algae, both types of reactions take place in chloroplasts. Photons for the light reaction are absorbed by antenna pigments, and the energy is transferred to reaction centers, where it enters either photo system I or photo system II. These two systems, working in conjunction, carry out the light reactions. Photo system I oxidize water, and photo system I reduce  $\text{NADP}^+$ . Together, the systems drive the transport, of protons across chloroplast membranes to provide a pH gradient to drive ATP production. In a "short circuit" of photo system I called cyclic photo-phos-phorylation, only ATP is produced. Some photo synthetic bacteria, on the other hand, use a cyclic version of photo system II to generate ATP.

Under conditions of low  $\text{CO}_2$  and high  $\text{O}_2$ , plants undergo an oxidative process Called photorespiration. This process is

essentially inefficient, and some tropical plants compensate for it via the  $C_4$  cycle, which is less sensitive to high  $O_2$  level.

## 2. Bio-Geochemical cycles:

In this cycle the interrelationship among plants, animals and natural gases and other natural resources has been established. In photosynthesis the dependency between animals and plants has shown. The chemical elements, including the all essential elements circulate in the biosphere in characteristic pathway from environment to organisms and back to the environment. These more or less circular pathways are known as biogeochemical cycles. The movement of these elements and inorganic compounds that are essential to life can be contently designated as nutrient of cycling. Each nutrient cycle can also be conveniently divided into two Components or pools.

- (i) The reservoir pools, the large, slow-moving, generally non-biological components.
- (ii) The labile or cycling pool, a smaller but more active portion that is exchanging rapidly between organisms and their immediate environment.

Many elements have multiple reservoir posts and some have multiple labile pools. From the view point of the ecosphere as a whole, biogeochemical cycles fall into two basic groups.

- (i) Gaseous types, in which the reservoir's is in the atmosphere or the hydrosphere,
- (ii) Sedimentary types, in which the reservoir is in the crust of Earth.

The dissipation of energy in some form is always necessary to drive nutrient cycles.

## 3. Ecosystem:

Living (biotic) organisms and their nonliving (abiotic) environment are inseparably interrelated and interact with each other. Any unit that includes all the organisms (the biotic the physical environment so that aglow of energy community) in a given area interacting with leads to a clearly defined biotic structures and cycling of materials between living and non living components is an ecological system of ecosystem. It is more than a geographical unit of (eco-region), it is a functional system unit with inputs and outputs, and boundaries that can be either natural or arbitrary,

## 4. Respiration:

Respiration is the sum - total of two processes or phases:

- 1) External or lung respiration.
- 2) Internal of tissue respiration.

The main functions of respiration are to provide oxygen to the tissue and remove Carbon dioxide. As most tissues in the body survive on oxygen to produce energy, there is a requirement for a continuous supply of oxygen and removal of carbon dioxide. The following four major components of respiration are as follows:

- (i) Pulmonary ventilation (inflow and outflow of air between the atmosphere and the lung alveoli).
- (ii) Diffusion of oxygen ( $O_2$ ) and carbon dioxide ( $CO_2$ ) between the alveoli and the blood.
- (iii) Transport of the oxygen and carbon dioxide in the blood and body fluids to and from the body's tissue cells.
- (iv) Regulation of ventilation and other facets of respiration.

The respiratory system is made up of a gas exchanging organ (the lungs) and a pump that ventilates the lung. The pump consists of the chest wall; the respiratory muscles, which increase and decrease the size of the thoracic cavity; the areas in the brain that control the muscles; and nerves that connect the brain to the muscles. At rest, a normal human breathes 12-15 times a minute. About 500 ml. of air per breath, or 6-8 L/min. is inspired and expired. This air mixed with the gas in the alveoli, and, by simple diffusion oxygen ( $O_2$ ) enters the blood in the pulmonary capillaries while carbon dioxide ( $CO_2$ ) enters the alveoli. In this manner, 250 ml. of  $O_2$  enters the body per minute and 200 ml of  $CO_2$  is excreted.

Traces of other gases such as methane from the intestine are also found in expired air. Alcohol and acetone are expired when present in appreciable quantities in the body. Indeed over 250 different volatile substances have been identified in human breath.

## 5. Metabolism:

The metabolism of an organism may be defined as the sum total of all the enzyme-catalyzed reactions that occur in an organism. The large number of reactions in a cell is organized into a relatively small number of sequences or pathways. It is a highly coordinated and purposeful cell activity, in which multi-enzyme systems cooperate. This obviously points out to the fact that the metabolism of even a simple unicellular organism is time-variant, i.e., all its aspects are not actually a expressed at any given point.

Metabolism can be subdivided into two major categories - catabolism, those processes related to degenerate of complex substances, and anabolism, those processes concerned primarily with the synthesis of complex organic molecules.

### 6. Biologic oxidation and its Biomedical Importance:

The oxidation is always accompanied by reduction of an electron acceptor. In oxidation the electrons are removed and reduction as the gain of electrons. The principle of oxidation-reduction applies equally to biochemical system and is an important concept underlying understanding of the nature of biologic oxidation. It will be appreciated that many biologic oxidations can take place without the participation of molecular oxygen, eg. dehydrogenation.

The anaerobic bacteria survive in the absence of oxygen; the life of higher animals is absolutely dependent upon supply of oxygen. The principal use of oxygen is in respiration, which may be defined as the process by which cells derive energy in the form of ATP from the controlled reaction of hydrogen with oxygen to form water. In addition, molecular oxygen is incorporated into a variety of substrates by enzymes designated as oxygenases; many drugs pollutants and chemical carcinogens (xenobiotics) are metabolized by enzymes of this class, known as cytochrome P450 System Administration of oxygen at high pressure (hyperbaric therapy) has proved of value, although this can results in oxygen toxicity.

### III. Discussion, Conclusion and Recommendations

Photosynthetic microalgae have attracted a lot of attention in the context of phyco-remediation, indeed, they can fixate several pollutants such as nitrogen, phosphorous, and heavy metals through their growth, in addition to achieving a high removal rate (90+%), the capture carbon dioxide (CO<sub>2</sub>). Finally, they can be cultivated using fresh, marine, or brackish waters in non-arable lands,

Bioremediation is considerably beneficial to the environment if it is adequately performed. To achieve this, it is crucial to develop technologies previous physicochemical and microbial characterization of the site: determining with it, the concentration, the type and toxicity of the contaminant, the impacted ground area and volume, and the nutritional and environmental conditions of the site.

The respiratory system participates in maintaining the acid base balance of the body by eliminating carbon-dioxide (CO<sub>2</sub>) from the body. Spontaneous respiration is produced by rhythmic discharge of motor neurons that innervate the respiratory muscles, This discharge is totally dependent on

nerve impulses from the brain; breathing stops if the spinal cord is transected above the origin of the phonic nerves.

The rhythmic discharges from the brain that produce spontaneous respiration are regulated by alternations in arteries PO<sub>2</sub>, PCO<sub>2</sub>, and H<sup>+</sup> concentration, and this chemical control of breathing is supplemented by a number of nonchemical influences. In the nature the abiotic and biotic resources are a continuously maintaining the interrelationships in the form of photosynthesis, respiration, metabolism and bio-geo-chemical cycles. In the pollution free medium the interdependencies among plants, animals and abiotic resources make the bioremediation and immunity.

The rapid advances in science and technology have put the scientists and technologists on their heels to cope up with the simultaneous changes that have occurred during the past decades. Various types of revisions, rectifications as well as modifications and sometimes even all together innovated ideas that developed in numerous fields of specializations have required to be incorporated with the advanced level concepts in order to keep pace with the resent researches advanced in the concerning fields of the have study. The innovative techniques but the researches on consistent think' and rethink level to entertain higher concepts related to the biology.

Based on the study the following recommendations can be advanced since the incorporation of units of Bioremediation plays a significant role in bringing about:

- 1) Awareness towards health and hygiene through cleanliness of the local, natural resources (e.g., the rivers, drainage, pond and lakes etc.)
- 2) Awareness about the protection of flora and fauna, especially the former to check soil erosion, landslides, on set of flouting etc.

The protection of flora and fauna is essential for bioremediation also various medicines are produced by plants and great diversity of flora, the diversity of fauna also helps the life of plants.

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