

Study on Effect of Water Pollution on Phytoplankton

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Abstract: Phytoplankton is the base of several aquatic food webs. In a balanced ecosystem, they provide food for a wide range of sea creatures including whales, shrimp, snails, and jellyfish⁴. In this paper our aim is to study about effect of water pollution on phytoplankton. Due to water pollution and water temperature etc. Phytoplankton superfluity is affected.

Keywords: - water pollution, phytoplankton, phytoplankton-pollution.

INTRODUCTION

Phytoplankton, also known as microalgae, are similar to terrestrial plants in that they contain chlorophyll and require sunlight in order to live and grow. The two main classes of phytoplankton are dinoflagellates and diatoms. Dinoflagellates use a whip-like tail, or flagella, to move through the water and their bodies are covered with complex shells. Diatoms also have shells, but they are made of a different substance and their structure is rigid and made of interlocking parts⁴.

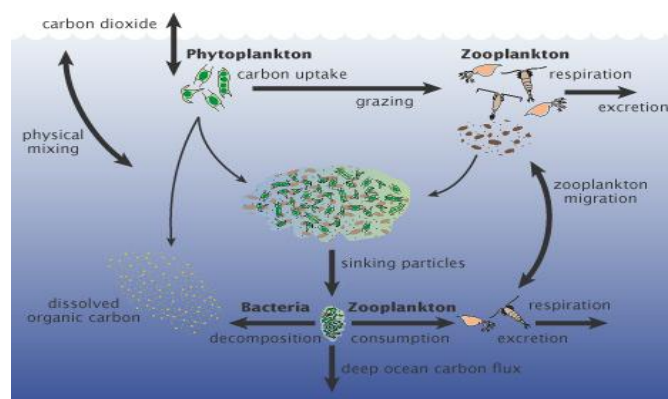
Phytoplankton are also crucially dependent on minerals. These are primarily macronutrients such as nitrate, phosphate or silicic acid, whose availability is governed by the balance between the so-called biological pump and upwelling of deep, nutrient-rich waters. However, across large regions of the World Ocean such as the Southern Ocean, phytoplankton are also limited by the lack of the micronutrient iron. This has led to some scientists advocating iron fertilization as a means to counteract the accumulation of human-produced carbon dioxide (CO₂) in the atmosphere⁸.

A culture must be aerated or agitated in some way to keep plankton suspended, as well as to provide dissolved carbon dioxide for photosynthesis. In addition to constant aeration, most cultures are manually mixed or stirred on a regular basis. Light must be provided for the growth of phytoplankton. The colour temperature of illumination should be approximately 6,500 K, but values from 4,000 K to upwards of 20,000 K have been used successfully. The duration of light exposure should be approximately 16 hours daily; this is the most efficient artificial day length⁷.

The phytoplankton is the foundation of the food web, in providing a nutritional base for zooplankton and subsequently to other invertebrates, shell fish and finfish

In the aquatic ecosystem (Emmanuel and Onyema, 2007)³.

Through photosynthesis, phytoplankton consume carbon dioxide on a scale equivalent to forests and other land plants. Some of this carbon is carried to the deep ocean when phytoplankton die, and some is transferred to different layers of the ocean as phytoplankton are eaten by other creatures, which themselves reproduce, generate waste, and die⁵.



Source: www.earthobservatory.nasa.gov/Features/Phytoplankton/

Dugdale (1975) described the growth of an algal population as being proportional to the effect of light on photosynthesis (Ryther, 1956; Yentsch, 1974), the concentration of nutrients, and the maximum specific growth rate. Pollutants can affect the relation between growth rate and each of these variable¹.

Ogamba et al. (2004), Emmanuel and Onyema (2007), Abowei et al. (2008), Zabbey et al. (2008), Davies et al. (2009) and Nkwoji et al. (2010). Margalef (1968) had says that species with the highest self-sustaining natural mechanisms of natural increase usually become dominant. This may account with the widespread dominance of Bacillariophyceae in both fresh and brackish waters³.

A 2010 study published in Nature reported that marine phytoplankton have declined substantially in the world's oceans over the past century. Phytoplankton concentrations in surface waters were estimated to have decreased by about 40% since 1950 alone, at a rate of around 1% per year, possibly in response to ocean warming. The study generated debate among scientists and led to several communications and criticisms, also published in Nature.

The airborne fraction of CO₂ from human emissions, the percentage neither sequestered by photosynthetic life on land and sea nor absorbed in the oceans a biotically, has been almost constant over the past century, and that suggests a moderate upper limit on how much a component of the carbon cycle as large as phytoplankton may have declined, if such declined in recent decades

MATERIALS

The effects of water pollution on phytoplankton composition in Chambal River. We collected samples of Baccillariophyceae, Chlorophyceae.

RESULTS

Table 1 represents phytoplankton family in the study area. We study on Phytoplankton namely Baccillariophyceae, , Chlorophyceae. They are showing water pollution.

Relative abundance of major phytoplankton families in the study area

| Major phytoplankton families | Relative abundance (%) |
|------------------------------|------------------------|
| Baccillariophyceae | 73 |
| Chlorophyceae | 27 |

CONCLUSION

In this article we study about effect of water pollution on Phytoplankton. Study on effect of water pollution on Phytoplankton by various authors, we see in all studies mainly pollution affect on Phytoplankton abundance which is not good for sea creatures or animals because Phytoplankton provide food for them. It is directly affected on sea creatures or animals, fresh water and it affect aquatic ecosystem.

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