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Eutrophication- An Ecological Men- ace

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Abstract

Eutrophication is an unwanted incident which leads to accrual of excess nutrient in water bodies resulting destructive effect in aquatic ecosystems. It may be driven through naturally or anthropogenic activities. Eutrophication causes the depletion of dissolved oxygen amount and aggravates the formation of Algal Bloom in water bodies which in turn pollute the water extremely. To address those problems, major concern should be emphasized on the optimum use of fertilizers in agricultural field and discharging the organic waste product into the water bodies.

Introduction

Eutrophication comes from a Greek word “Eutrophos” which means “Well nourished”. Eutrophication is the situation when a water body becomes overly enriched with minerals and nutrients which include excessive growth of algae. This process may results in oxygen depletion of the water body. This is considered to be a natural aging process in lakes that may take thousands of years. Eutrophication is induced by the discharge of nitrate or phosphate containing detergents, fertilizers and also discharge of domestic sewage and industrial wastewater into an aquatic ecosystem. It causes huge growth of phytoplankton, algae and impart a characteristic colouration to water (Green, yellow or brown). The huge and rapid growth of algae in the water body causes algal bloom which becomes polluted the aquatic ecosystem and also inhibits the growth of other aquatic animals and plants.

Types of Eutrophication

There are mainly two types of Eutrophication occurs in our environment *viz.* Natural eutrophication and Cultural eutrophication.

Natural Eutrophication

It is a normal process of the nature not interfered by human activities. Natural Eutrophication takes many years to affect the water bodies.

Cultural Eutrophication

It is the process that accelerates natural eutrophication by the human activities. It is caused by increased nutrients and minerals input into the aquatic ecosystem which causes excessive growth of algae (algal bloom) leads to decrease amount of dissolved oxygen in the water bodies and it also reduce the growth of aquatic plants and animal, ultimate causes aquatic life death.

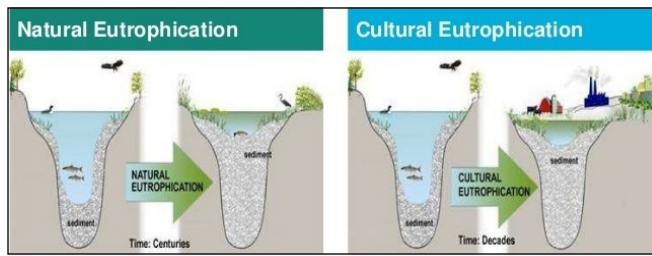
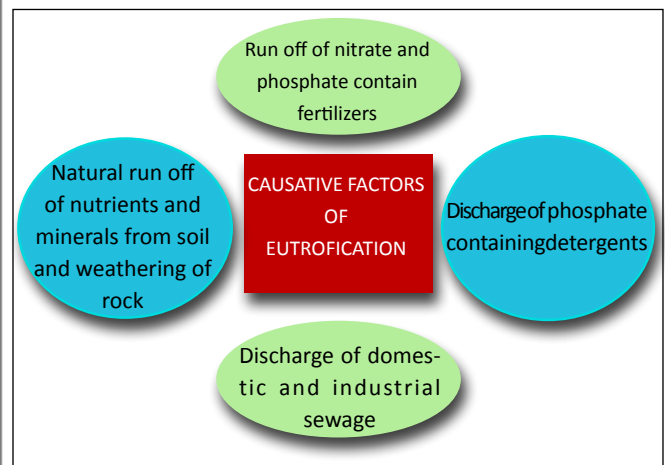


Figure 1: Types of Eutrophication

Cause of Eutrophication

Eutrophication is a serious problem in our environment that is predominantly caused by human activity which deteriorates the water quality in the aquatic ecosystem. Cause of Eutrophication mainly depends on some factors which are described below:

- Agricultural practices and the use of fertilisers on lawns and other fields contribute to phosphate and nitrate containing nutrient accumulation in soil when this nutrients reach high concentration levels and the ground is no longer assimilate them, they carried by rain into groundwater and rivers that flow into lakes and seas. In this region dense growth of algal blooms and plant life such as the water hyacinths in the aquatic environment, ultimate it's responsible for Eutrophication.
- Treated and untreated sewage water is directly discharge into water bodies like river, lakes, oceans etc which introduces high amount of chemical nutrients that stimulates the rapid growth of algae into the water bodies which is very much threatens to survive of aquatic life. The direct discharge of industrial waste water into different water bodies presents similar outcomes.
- Discharge of domestic sewage and phosphorus containing detergents contributes high quantities of nutrients and minerals in the aquatic ecosystem which triggers disproportionate growth of microscopic floating plants. As a results, dense growth of algal blooms which becomes polluted water bodies that is too much dangerous for aquatic organisms like fish, snails, crabs, tortoises and many other aquatic life.
- Many natural events like floods, soil deposition, weathering rocks, erosion and natural flows of river and streams can also wash excess nutrients off the land into water system that causing excessive growth of algal blooms and also old aquatic bodies naturally accumulate sediments as well as phosphorus and nitrogen containing nutrients and minerals which contributes to the explosive growth of algae in the aquatic ecosystem and its presents similar outcomes.
- Some other factors like run off of farm manure, concentrated animal feeding operations (CAFOs), Aquiculture (culture of fish, shellfish and aquatic plants) are also contributes high amount of nutrients which decrease the water quality through the vast growth of algal bloom which destroy the aquatic environments.



Impact of Eutrophication on Environment

- Eutrophication can have serious effects on ecosystem like rapidly increased biomass of phytoplankton resulting algal blooms.
- Decrease in water transparency by the rapid growth of phytoplankton in the water body can causes increased turbidity and it prevent the penetration of light into the lower depths of water body. In this reason, aquatic plants and animals cannot grow properly and ultimate causes death.
- Eutrophication causes depletion of dissolved oxygen (Hypoxia) resulting in increased incidences of fish killing and dead benthic animals.
- Aquatic species diversity decrease quickly which effects on food chain and food web in aquatic ecosystem, ultimately it effect on environment.
- Toxic or inedible phytoplankton species (Harmful algae) causes harm through the production of toxins which can effect co-occurring organisms and alter food web dynamics. These toxic products also increase human malady, mortality of fishes, birds and mammals following consumption or indirect exposure Harmful Algal Bloom (HAB) toxin and it also influence economic losses to coastal communities and commercial fisheries (Kennish, 2002).
- Algal toxins are mainly observed in marine ecosystem where they can accumulate in shellfish and more generally in sea food reaching dangerous levels foe human as well as animal health like paralytic, neurotoxin and diarrhoeic shellfish poisoning.

Control Measures of Eutrophication

- Use phosphate and nitrate free detergents to reduce rapid growth of algae in the water body and also applying algacides to control algal growth in aquatic ecosystem (Figure 2).
- Algal bloom should be removed from water body and it should

not be disposed into the water after killing them because it further generate plant nutrient during decomposition.

- Waste water like organic and inorganic sewage should be discharge into rivers and other water bodies only after proper treatment. Before disposal into water system, nitrate and phosphate should be removed from waste water.
- Control runoff water from agricultural soil containing fertilizers to aquatic ecosystem (Paerl *et al.*, 2002).



Figure 2: Effect of Eutrophication

Conclusion

Excessive nutrient enrichment in the water body causes of Eutrophication which many negative repercussions on aquatic ecosystem. Eutrophication mainly accelerate

by rapid growth of algae (algal bloom) which causes vast enrichment of minerals and nutrients in the water body by discharge of nitrate or phosphate containing detergents, fertilizers, organic and inorganic sewage into a aquatic ecosystem. We should be prevented the excessive input of the nutrients in the water body and also filtrate the surface water and removed algal bloom from water body. Ultrasonic irradiation recently acts as an alternative solution to control algal bloom in aquatic ecosystem. The problem of Eutrophication is still very real and research is still being developed to decrease the water pollution caused by algal bloom.

References

Kennish, M.J., 2002. Environmental threats and environmental future of estuaries. *Environmental Conservation* 29, 78–107.

Paerl, H.W., Dennis, R.L., Whitall, D.R., 2002. Atmospheric deposition of nitrogen: implications for nutrient over-enrichment of coastal waters. *Estuaries* 25, 677–693.