EFFECT OF INORGANIC WASTES ON THE GROWTH OF AQUA LIFE

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ABSTRACT

World fish production has increased significantly with the intense use of manufactured diets. Nowadays, the main objectives in fish farming are improvement of the foods used and the reduction of nutrients excreted in the water. Nitrogen (N) in metabolic waste produced by fish are the origin of most dissolved N and P waste resulting from intensive aquaculture operations. The excess of these two elements in the effluents of aquaculture systems leads to eutrophication and a consequent change in the aquatic ecosystem .Levels of N in fish food and the efficiency with which they are used influences the amounts of these nutrients that are excreted into the environment. Reducing the outputs of these dissolved wastes is considered to be a key element for the long-term sustainability of aquaculture around the world and appropriate balanced diets allow the amount of these compounds in the water to be significantly decreased. In the present paper we are concentrating upon effects of nitrogenous waste on Aqua culture.

Keywords: *Eutrification, Nitrogen and Aqua Culture.*

No. of References: 5

INTRODUCTION

A river is defined as a large natural stream of water emptying into an ocean, lake, or other body of water and usually fed along its course by converging tributaries. Often oceans are considered as so vast that they are virtually unlimited in their ability to accommodate the waste products of human civilization. But there are substantial evidence to indicate global pollution of coastal waters and open oceans due to dumping of domestic and industrial wastes, sewage, oil drilling in coastal waters, spilling of oil tankers, etc. The oceans have in fact; become the final settling basin for millions of tons of waste products from human activities. Rivers and streams drain water that falls in upland areas. Moving water dilutes and decomposes pollutants more rapidly than standing water, but many rivers and streams are significantly polluted all around the world. A primary reason for this is that all three major sources of pollution (industry, agriculture and domestic) are concentrated along the rivers. Industries and cities have historically been located along rivers because the rivers provide transportation and have traditionally been a convenient place to discharge waste. Agricultural activities have tended to be concentrated near rivers, because river floodplains are exceptionally fertile due to the many nutrients that are deposited in the soil when the river overflows. Inorganic waste may take hundreds of year to decompose, or may not decompose at all. However, inorganic waste can often be recycled. The main thing which affecting the growth of aqua life is Nitrogenous and eutrophication which were discussed briefly in a Darvil BNR process denitrification is achieved in the anoxic zone/s of the process. Under anoxic conditions certain heterotrophic bacteria are stimulated into utilising nitrates and nitrites as final electro acceptors for cellular respiration in place of oxygen (Ketchum, 1988; Cappuccino and Sherman, 1992). This result in oxidation of organic matter as well as reduction of the nitrates and nitrites into nitrous oxides and nitrogen gas (Wanner and Grau, 1989).In the present paper we are concentrating on nitrogenous wastes affecting the growth of aqua life.

METHODOLOGY

Most of the inorganic liquid wastes come from industry, and their dilution in large river waters renders them harmless. Some inorganic toxic wastes can become concentrated up the food chain to fish. Many of the pollution incidents which have been resulted in largest number of deaths and serious injuries from water pollution have been arisen from human ingestion of fish, or crops contaminated with heavy metals or other inorganic compounds. Limited quantity of general inorganic substances help in the growth of Algae planktons etc (which served as food for aquatic species) If the concentration of these inorganic wastes increases it leads to in balance of Aqua ecosystem because there will be rapid increase in growth of plankton and algal species due to this DO will decrease this will leads to decrease in aquatic organisms , some of inorganic compounds include (Nitrogen, phosphorus) Organic nitrogen and ammonia can be determined together and have been referred to as "Kjeldahl nitrogen, or TKN," a term that reflects the technique used in their determination (19th Edition, Standard Methods, 1995).Organic Nitrogen: It is the by-product of living organisms. It includes such natural materials as proteins and peptides, nucleic acids and urea, and numerous synthetic organic materials. Typical organic nitrogen concentrations vary from a few hundred micrograms per liter in some lakes to more than 20 mg/L in raw sewage (19th edition, Standard Methods, 1995).Phosphorus is often the limiting nutrient for plant growth, meaning it is in short supply relative to nitrogen. Phosphorus usually occurs in nature as phosphate, which is a phosphorous atom combined with four oxygen atoms, or PO_4^{-3}. Phosphate that is bound to plant or animal tissue is known as organic phosphate. Phosphate that is not associated with organic material is known as inorganic phosphate. Both forms are present in aquatic systems and may be either dissolved in water or suspended (attached to particles in the water column).Inorganic phosphate is often referred to as orthophosphate or reactive phosphorous. It is the form most readily available to plants, and thus may be the most useful indicator of immediate potential problems with excessive plant and algal growth.

According to Hutchinson (1969), the Eutrophication is a natural process which literally means "well-nourished or enriched. It is a natural state in many lakes and ponds which have a rich supply of nutrients, and it also occurs as part of the aging process in lakes, as nutrients accumulate through natural succession. Eutrophication becomes excessive, however, when abnormally high amounts of nutrients from sewage, fertilizer, animal wastes and detergents, enter streams and lakes, causing excessive growth or 'bloom' of micro-organisms and aquatic vegetation.

RESULTS & DISCUSSION

Most freshwater lakes, streams, and ponds have a natural pH in the range of 6 to 8. Acid deposition has many harmful ecological effects when the pH of most aquatic systems falls below 6 and especially below 5.

Here are some effects of increased acidity on aquatic systems: As the pH approaches 5, non-desirable species of plankton and mosses may begin to invade, and populations of fish such as smallmouth bass disappear. Below a pH of 5, fish populations begin to disappear, the bottom is covered with undecayed material, and mosses may dominate near shore areas. Below a pH of 4.5, the water is essentially devoid of fish. Aluminium ions (Al^{3+}) attached to minerals in nearby soil can be released into lakes, where they can kill many kinds of fish by stimulating excessive mucus formation. This asphyxiates the fish by clogging their gills. It can also cause chronic stress that may not kill individual fish, but leads to lower body weight and smaller size and makes fish less able to compete for food and habitat. The most serious chronic effect of increased acidity in surface waters appears to be interference with the fish' reproductive cycle. Calcium levels in the female fish may be lowered to the point where she cannot produce eggs or the eggs fail to pass from the ovaries or if fertilized, the eggs and/or larvae develop abnormally (EPA, 1980).

Extreme pH can kill adult fish and invertebrate life directly and can also damage developing juvenile fish. It will strip a fish of its slime coat and high pH level 'chaps' the skin of fish because of its alkalinity. When the pH of freshwater becomes highly alkaline (e.g. 9.6), the effects on fish may include: death, damage to outer surfaces like gills, eyes, and skin and an inability to dispose of metabolic wastes. High pH may also increase the toxicity of other substances. For example, the toxicity of ammonia is ten times more severe at a pH of 8 than it is at pH 7. It is directly toxic to aquatic life when it appears in alkaline conditions. Low concentrations of ammonia are generally permitted for discharge. A catchment management approach should be developed, wherever possible, since it addresses water pollution control. This approach combined with participatory networks of the local population sets out an alternative to conventional top-down and sectoral approaches that can fail to produce desired results and often lead to further water resources degradation (Gurjar 1994). To this effect, land and water management should be better integrated, and greater control should be exercised over land clearing activities, which impact water quality through soil erosion. Integrated water resource management can only be successful once legal and institutional barriers between different sectors are removed. Government branches and authorities responsible for the water policy sector, including water pollution control, should be reorganized and better co - ordinated in order to achieve administrative efficiency and effectiveness. In the context of integrated water management, the option for water utilities to manage water supply and sewage together should be explored. This would allow them to have control (and responsibility) over water quality throughout the complete water cycle, thus providing an incentive for improved and co -ordinated action towards water pollution prevention, which in turns helps in improvisation or the growth of aquatic life.

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