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WATER QUALITY MANAGEMENT BY BIOLOGICAL MEANS: BIOMONITORING

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ABSTRACT:

A common method for evaluating the effects of pollution releases on the environment is "biological monitoring." It is necessary to assess the process in terms of false positives and false negatives. A false positive is a signal that, in reality, there hasn't been an escalation above previously set quality control parameters. An indicator that conditions are acceptable when they are not is known as a false negative. Since statistics can expressly express confidence in the outcomes of biological monitoring, they should be used more frequently in this context. Professional judgment on whether to take immediate action or wait for more corroborating facts will be more objective and dependable with suitable statistical evaluation of the data. To maximize.

KEYWORDS:

BIOMONITORING, BIOINDICATOR, DIVERSITY INDICES, SAPROBIC INDEX, MACRO-INVERTEBRATES.

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INTRODUCTION:

Water quality includes all physical, chemical and biological factors that influence the beneficial use of water. Physico-chemical analysis is the prime consideration to assess the quality of water for its best utilization like drinking, irrigation, fisheries industrial purpose etc and helpful in understanding the complex processes also interaction between the climatic and biological processes in the water.

Water quality refers to the physical, chemical and biological characteristics of a water body. These characteristics determine how and far what water can be used and the species and ecosystem process it can support. Water quality assessment can be defined as the evaluation of the physical, chemical and biological nature of water in relation to natural quality, human effects and identified uses. Water in its pure form occurs rarely in nature. There are many variations in the quality of low concentration of a few ions where as others have higher concentration of ions of many different kinds. Rapid growth of industries along with Urbanization has not only decreases the water availability but also deteriorate the quality of water. Biological monitoring or biomonitoring is the use of living organisms to determine the condition of the environment. The advantages of biomonitoring versus physical or chemical monitoring are: Biomoitoring reflects overall ecological integrity (Physical, Chemical, and Biological). In streams, biomonitoring can be done with benthic macro invertebrates, fish or periphyton but benthic macro invertebrates are generally the assemblage of choice

Benthic macro invertebrates or more simply “Benthos” are animals without backbones that are larger than ½ millimetres in size. Benthos – organisms that live on or within sediments, rocks, longs, debris and aquatic plants during some period in their life span includes immature forms of aquatic insects, molluscan, aquatic worms and crustaceans. Benthic macro invertebrates most preferably used in biomonitoring studies and is an important ecological tool to describe spatial and temporal changes in an aquatic ecosystem. But, various human factors used for recreation purposes, such as community bathing for personal hygiene, washing of clothes, irrigation etc. Cause habitat impairment and affecting the benthic biodiversity of streams, lakes and rivers.

The benthic community structure presents an integral measure of both autotrophic and heterotrophic processes occurring in the aquatic ecosystem. These macro invertebrate communities are usually dominated by two groups of organisms such as Oligocheates worms and Chironomid larvae (Bazzanti and Loret, 1982).

REVIEW OF LITERATURE:

Unfortunately, the biological aspects of water quality has often received little consideration in river water quality research relative to physical and chemical aspects (James and Evison 1979, Karr 1991) where most national standards for assessment of river water quality only includes physical and chemical indicator relevant to specific pollutants and stressors (Boonsoong et al., 2009). Water is vital to our existence in life and its importance in our daily life makes it imperative that thorough physico-chemical examinations conducted on water. Potable water is the water that is free from disease

producing macro-organisms and chemical substance that are dangerous to health (Lamikaran 1999) Bio-indicators are useful to offers the functional efficiency of water treatment plant which is one of important practical consideration (Thomas 1972). Parameter is one of the evaluations of physico-chemical used tools in assessing the water quality of water. Physico-chemical parameters persistent to both physical and chemical properties, changes and reactions different studies have been carried out using physico-chemical parameters alone, which proved its efficacy and accuracy (Agarwal and Sexena 2011).

The use of Benthic Macro-invertebrate as indicators of water quality has been suggested by: Good night (1973), Rao et al., (1985), Milbrink (1987), Sharma (2006), Smitha et al., (2007), Wantzen (2008), USGS (2009). All physico-chemical parameters determined in the Abeokuta 12 Nigeria, Bhavani river, Challawa river, Narmada river, Shittu et al., (2008), Varunprasath and Daniel (2010), Indabawa (2010), Sharma et al., (2012). Benthic macro-invertebrates are the most diverse aquatic organisms in a paddy field ecosystem; these organisms act as decomposers, consumers of green biomass and food for many fishes and other macro-vertebrates (Wallace and Webster 1996).

Benthic macro-invertebrates are the most diverse aquatic organisms in a paddy field ecosystem; these organisms act as decomposers, consumers of green biomass and food for many fishes and other macro-vertebrates (Wallace and Webster 1996). Macro-invertebrates play a critical role in ecosystem balance by facilitating flow of energy and matter through food web and constitute an important tropic level in the aquatic ecosystem (Aweng et al., 2012). All physico-chemical parameters determined in the Abeokuta Nigeria, Bhavani river, Challawa river, Narmada river (Shittu et al., 2008), (Indabawa, 2010), (Varunprasath et al., 2010), (Sharma et al., 2012). Benthic macro-invertebrate sensitive to the environmental changes and they are used as bio indicators for pollution and health of a water body (Sarkar, 2012).

Macro-invertebrates are an important component of stream ecosystems and are a link in the transfer of material and energy from producers to top level consumers and also act as excellent bio-indicators of stream health. This review discusses some of the factors which regulate the occurrence and distribution of stream macro-invertebrates namely water current, temperature, substrate, drainage basin land use/land cover, vegetation, pH of water, drought, flood , food, shade and stream geomorphology (Hussain and Pandit 2012).

Studied the ecological distribution of macro-invertebrate assemblage from sonamarg streams of Kashmir Himalaya They recorded 33 species of macro-invertebrates from Kashmir Himalayas (Bhat et al., 2011). Aquatic macro-invertebrates organisms that is large enough to be seen with the naked eye, lack of a backbone and inhabit all types of waters including lentic, lotic and muddy habitats (Viklund, 2011).

A preliminary note on the benthic fauna of lower Lake Bhopal (M.P.) (Jakher 1980) .Limnological studies on rivers have been studied by many worker like (Rajarkar et al., 2003), (Pandey 2003), (Sharma and Chaturvedi 2007), (Nath and Shrivastava 2001), (Dutta et al., 2000), (Sawhney 2004), (Tyagi et al., 2013), (Collier et al., 2014), (Meritt et al., 2008).

Conclusion- In this conversation, biological monitoring has come to refer to nearly any kind of data collected in order to evaluate the impact of discharges on the environment. To our understanding, Biological monitoring consists only on ongoing data gathering. to determine if a clearly specified quality control requirement are fulfilled. Should these prerequisites not be fulfilled, there would be made to take remedial measures right away. Objective of Biological monitoring involves issuing cautionary signals about risks, spotting spills, identifying environmental patterns, or cycles, selecting the most pertinent and minimally duplicated data for keeping an eye on and assessing the environmental impacts related to when genetically modified organisms are introduced into organic structure. Not every need can be met by a single design, yet if the investigators possess well-defined objectives for.

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