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"A SYSTEMATIC STUDY OF WATER POLLUTION IN JHARKHAND ON THE BASIS OF WATER QUALITY PARAMETERS"

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ABSTRACT

The addiction of various kinds of pollutants and nutrients through the agency of sewage, rainwater, and flood, agriculture runoff, human activities etc., into the water bodies, brings about a series of changes in the physicochemical conditions of water and bottom sediment properties of the aquatic system. Among the various physico-chemical factors temperature, turbidity, P^H, dissolved gases, alkalinity, different ions, B.O.D., and C.O.D. exert their influence individually and synergistically while the nutrient status such as phosphate, nitrogen, silicate and organic carbon determine the range of biota.

KEYWORDS: *The specific contaminants leading to pollution in water include a wide spectrum of chemicals, pathogens and physical changes such as elevated temperature and discoloration. While many of the chemicals and substances that are regulated may be naturally occurring the concentration is often the key in determining what is a natural component of water and what is a contaminant. High concentrations of naturally occurring substances can have negative impacts on aquatic flora and fauna*

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INTRODUCTION

Water pollution is a major global problem which requires ongoing evaluation and revision of water resources policy at all levels. Water is typically referred to as polluted when it is impaired by anthropogenic contaminates and either does not support a human use, such as drinking water and undergoes a marked shift in its ability to support its constituent biotic communities such as fish. A large number of parameters signifying the quality of waters in various uses have been proposed. Regular monitoring of them not only prevents diseases and hazards but also checks the water resources from going further polluted. Water pollution can be studied on the basis of the following parameters

Temperature

The Parameter of temperature is basically important for its effects on the chemistry and biological reactions in the organisms in water. A size in temperature of the water leads to the speeding up of the chemical reactions in water, reduces the solubility of gases and amplifies the taste and odors. Water in the temperature range 7^0C to 11^0C has a pleasant taste and is refreshing. At elevated temperature, the metabolic activity of the organisms increases, requiring more oxygen but at the same time, the solubility of oxygen decreases, thus developing stress.

Turbidity:

Turbidity in water is caused by the substances not present in the form of true solution. True solutions have a particle size of less than 10^{-9} cm. Any substance having more than this size will produce aturbidity. The turbidity of water is actually the expression of optical property in which the light is scattered by the particles present in the water. Turbidity in natural waters is caused by clay, silt, organic matter, phytoplankton, and other microscopic organisms. Turbidity makes the water unfit for domestic purposes, food and beverage industries, and other industrial uses.

P^H:

P^H is the measure of the intensity of acidity of alkalinity and measures the concentration of hydrogen ions in water. Most natural waters are generally alkaline due to the presence of sufficient quantities of carbonates. A P^H of water gets drastically changed with time due to the exposure of air, biological activity, and temperature changes. Significant changes in P^H occur due to the disposal of wastes from industries. In natural waters, P^H also changes due to variation in photosynthetic activity which increases the P^H due to consumption of Co_2 in the process. High P^H induces the formation of trihalomethanes which are toxic. P^H below 6.5 starts corrosion in pipes. Thereby releasing toxic metals such as Zn, pb, Cd, and Cu etc.

Alkalinity:

The alkalinity of water is its capacity to neutralize a strong acid and is characterized by the presence of all hydroxy ions capable of combining with the H^+ ions. Alkalinity in neutral waters is due to free hydroxyl ion formed by hydrolysis of salts formed by wastes acids and strong bases.

$$A^- + H\text{-}OH \rightleftharpoons HA + OH^-$$

Most of the alkalinity in neutral waters is formed due to the dissolution of Co_2 in water. Carbonates and bicarbonates thus formed are dissociated to yield OH^- ions.

$$C0_2 + H_20 \rightleftharpoons H_2CO_3$$

$$H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$$

$$HCO_3^- \rightleftharpoons H^+ + CO_3$$

$$CO_3^{2-} + 2H.OH \rightleftharpoons H_2CO_3 + 2OH^-$$

Alkalinity is also produced by the action of water on limestone or chalk.

$$CaCO_3\ (s) + H_20 + CO_2 \rightleftharpoons Ca(HCO_3)_2\ (aq.)$$

The high alkalinity value is not desirable for water in domestic uses. The alkalinity value is important in calculating the dose of alum and biocides in water. The ratio of alkalinity to that of alkaline earth metals is a good parameter determining the suitability irrigation water.

Dissolved Oxygen:

It is one of the most important parameters in water quality onessment and reflects the physical and biological processes prevailing in waters. Its presence is essential to maintain the higher forms of biological life in the water and the effects of a waste discharge in a water body are largely determined by the oxygen balance of the system. Low oxygen content can kill fish and other organisms present in water. The concentration of oxygen will also reflect whether the processes undergoing are aerobic or anaerobic. Low oxygen Concentrations are generally associated with heavy contamination by organic matter.

CONCLUSIONS

On the basis of the above discussion, it is very clear that a large number of parameters signifying the quality of waters in various uses and regular monitoring of them not only prevents diseases and hazards but also checks the water resources from going further polluted.

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