

AN INDICATOR OF THE CONTEMPORARY TROPHIC STATE: CHLOROPHYLL A CONTENT CONDITION IN RELATION WITH POLLUTION LOAD OF THE LOWER GANGA RIVER

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The Ganga is one of India's most revered rivers, serving as a vital cultural, historical, and ecological asset. The river is threatened by pollution from rapid urbanization, industrialization, and agricultural practices, threatening human health and the ecosystem. The proliferation of algal blooms is a developing worry in the Ganga's water. The measurement of Chlorophyll a, a pigment present in algae, serves as an indicator for evaluating algal biomass and monitoring water quality. In river systems, elevated Chlorophyll a concentrations signify eutrophication, a condition characterized by an ecological imbalance resulting from nutrient overabundance. Over five years and eight sampling sites, twelve water quality metrics, including Chlorophyll a, demonstrated notable geographic variations in their principal component analysis. Increased quantities of Chlorophyll a are positively correlated with higher water temperature, greater turbidity, enhanced specific conductivity, rising pH levels, and increased total alkalinity, indicating correlations with warmer waters, higher turbidity, and increased alkaline conditions. In downstream and coastal regions, the significant association between elevated Chlorophyll a concentrations and increasing levels of nitrogen, phosphorus, turbidity, and conductivity at numerous sample locations indicate early indication of eutrophication as a critical concern. The results indicate a significant ecological shift in which the accumulation of nutrient load is enhancing algal production, potentially leading to long-term ecosystem degradation.
