Seasonal variations in physico-chemical, ionic composition, biochemical, heavy metal and micronutrient status of industrial and municipal effluents in and around Guntur city: implications for water and soil quality

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ABSTRACT

This study examines the seasonal variation in physico-chemical, biochemical, heavy metal, and micronutrient characteristics of industrial and municipal effluents in and around Guntur City, and assesses their implications for water and soil quality. A total of ten effluent samples were collected during the monsoon season (August 2023) and the summer season (March 2024) and analyzed for key parameters, including pH, electrical conductivity, alkalinity, chlorides, carbonates, bicarbonates, calcium, magnesium, biological oxygen demand (BOD), chemical oxygen demand (COD), heavy metals (zinc, iron, cadmium, and lead), and selected micronutrients. The results revealed significant seasonal variations, with higher concentrations of pollutants observed during the summer season, attributable to reduced dilution and increased evaporation. These findings highlight the potential risks posed by untreated or inadequately treated effluent discharges to surrounding water bodies and agricultural soils. The study underscores the urgent need for effective wastewater treatment and management strategies, along with continuous monitoring, to prevent environmental degradation and protect public health in the region.

Keywords:*Heavy metals, Industrial effluents,Municipal effluents, Pollution, Soil quality and Water quality*