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Quality Evaluation of Ground Water near Sugar Industrial Area

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ABSTRACT

Sugar industries rank second among the agro based industries in India. Sugar industry is seasonal in nature and operates only for 120 to 200 days in a year. A significant large amount of waste is generated during the manufacture of sugar. Environmental pollution due to enhancement of industrial activities is one of the most significant problems of the century. Physiochemical parameters of water are enhanced due to discharge of untreated or partially treated industrial waste and sewage waste into water bodies. In the present research work it is proposed to collect ground water samples near to a sugar industry and the characterize then for physicochemical parameters such as pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Hardness (TH), Total Alkalinity (TA), Na^+, K^+, Ca^{2+}, Mg^{2+}, Chloride, Sulphate, Nitrate and Phosphate around the Sugar industry to assess the impact of effluent on ground water. The irrigation parameters like Percent Sodium (%Na), Sodium Adsorption Ratio (SAR), Residual Sodium Carbonate (RSC), Kelly's Ratio (KR) and Magnesium hazard (MH) are determined to assess the suitability of water for irrigation purposes. Metal ions viz., Li, Be, Al, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Rb, Sr, Ag, Cd, Cs, Ba and Pb are characterized to assess the metal toxicity in water. The water is further analyzed for microbial species to evaluate the degree of bacterial contamination of water. The research results revealed that water is chemically contaminated due to higher TDS and TH and Ca^{2+}, and chloride ion concentration. Lower concentration of metal ions in water indicates the absence of metal toxicity. Higher levels of Magnesium hazardous that the water is with higher magnesium hazardous which can deplete the quality of soil and the yield of the crap will be reduced in the study area. Presence of bacterial species Viz., Enterobacter, Proteus, Klebsiella, and E.coli in water can cause water borne disease if consumed for drinking purposes. Hence, this water is to be properly treated to remove the chemical contamination. Disinfection and sterilization methods are to be adopted for controlling the microbial contamination in water to protect the health of the public in the study area.

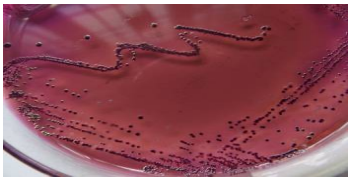
Graphical Abstract

S-1

***(Enterobacter,** Proteus)*

S-2

(Enterobacter, Klebsiella)



S-3

(E.Coli, Enterobacter)

The Photographs of the bacterial species identified in Ground water and Sugar effluent are presented in figures from S-1 to S-3

Keywords: Ground water, Effluent, Characterization, Metalion, Bacteria.