

## **SPATIAL DISTRIBUTION AND HEALTH RISK ASSESSMENT OF FLUORIDE AND NITRATE TOXICITY IN GROUNDWATER OF SEMI-ARID AREA, DILAWARPUR, NIRMAL DISTRICT, TELANGANA STATE**

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### **Abstract**

This study reports the fluoride and nitrate concentrations in groundwater resources of the semi-arid region of Dilawarpur in Nirmal District of Telangana State and its related potential health risk assessment issues. For this purpose, sixty one groundwater samples were analyzed for hydrochemical parameters including major ions, fluoride and nitrate. Results have revealed that most of the groundwater samples are alkaline in nature. Hydrochemical type of groundwater in the study area is mainly  $\text{CaHCO}_3$ , mixed  $\text{CaMgCl}$  while a few samples belonged to mixed  $\text{CaNaHCO}_3$  category. Non-carcinogenic health risks due to fluoride and nitrate exposure through consumption of groundwater were assessed using the (USEPA, 2004) method. In the study area fluoride concentration ranges from 0.24 to 3.28 mg/l and 0.08 to 1.52 mg/l and nitrate concentration ranges from 3 to 135 mg/l and 6 to 132 mg/l in the groundwater. Based on these results, 48% and 26% of fluoride ( $>1$  mg/l) and 34% and 44% of the nitrate ( $>45$  mg/l) in groundwater samples exceed the permissible limit. The Total Hazard Index (THI) quotients for adults and children indicated health hazards ( $\text{THI} > 1$ ) in 69% and 61% and 87% and 80% of samples, respectively. Hence, proper precautionary measures have to be taken to control health risk in this area.

**Keywords:** Groundwater quality, Nitrate, Fluoride, Piper, Gibbs and Health risk assessment