
Fluoride in Groundwater of Etcherla Mandal, Srikakulam District, Andhra Pradesh

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Abstract

Groundwater quality studies has been carried out in Etcherla Mandal, Srikakulam District, Andhra Pradesh, to assess the factors responsible for controlling the fluoride (F) content in groundwater. The concentration of F varies from 0.7 to 1.9mg/L. It exceeds the threshold limit of 1.5mg/L recommended for potable water in 52% of the groundwater samples. The results suggest that there is a good positive relation between F and both pH and HCO_3^- as well as between Na^+ and HCO_3^- and a poor positive correlation between F and TH. It indicates an active dissolution of F from bedrock minerals due to alkalinity rather than hardness. The occurrence of clays favours active solubility and dissolution of F bearing minerals as well as active anion exchange between F and OH. The higher rate of evaporation causes an increase of F in the groundwater due to precipitation of CaCO_3 and dissolution of CaF_2 to keep the chemical equilibria. Further, a positive correlation of F with K^+ , SO_4^{2-} and NO_3^- suggests that the usage of uncontrolled agro-chemicals for higher crop yields is also a source of F in the groundwater. The study suggests management measures to mitigate F content in the drinking water.

Keywords: Fluoride, Groundwater, Etcherla Mandal, Srikakulam District, Andhra Pradesh