

FLUORIDE CONTAMINATED GROUNDWATER FROM WARORA AREA OF CHANDRAPUR DISTRICT, CENTRAL INDIA: GROUNDWATER GEOCHEMISTRY AND COMMENTS ON THE SOURCE OF FLUORIDE

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Abstract

In Chandrapur district of eastern Maharashtra State, Central India fluoride contamination occurs mainly in Warora, Korpana and Rajura areas. In Warora area large number of cases of dental fluorosis and skeletal fluorosis are reported. Mottled teeth, stiff joints and muscular pains are also commonly reported in the villages. Geologically the area is underlain by mixed rock types ranging in age from Archean to Cretaceous. The main rock types are Archean granitic-gneisses; Vindhyan meta-sedimentaries represented by limestones, shales and cherts; Lower Gondwana sandstones and shales; as also limestone, sandstone and shales belonging to Lameta Beds. The youngest lithounits occur in the northern part of the study area belonging to the Deccan Trap lava flows. Detailed groundwater quality studies of the Warora area carried out during and post-monsoon seasons (2012) with special emphasis on fluoride contamination are reported here to know the latter's source, intensity and extent. A total of 57 bore well and dug well samples were collected from 32 villages. 88% of the samples show fluoride concentration more than the maximum permissible limit (i.e. more than 1.5 mg/l), out of which 52% of the samples show concentrations higher than 2.0 mg/l. Fluoride concentrations of more than the permissible limit were recorded in 30 villages, whereas the highest was observed in the village Yeoti (5.3 mg/l). Groundwater samples from shales and limestones of Lameta Formation and from basaltic lava flows show the highest concentrations of fluoride. Further, presence of high concentrations of fluoride in the above mentioned shallow aquifers in the area rules out the possibility of deeper gneissic aquifers as potential source of fluoride. Physico-chemical conditions along with leaching of fluoride bearing minerals from shallower lithostratigraphic horizons like those of Lameta Beds are likely to be responsible for higher concentration of F into the groundwater of Warora area.

Keywords: Warora, Chandrapur, Fluoride contamination, Groundwater