

Assessment of Fluoride Concentration in Groundwater in Kanchipuram, Tamil Nadu, India.

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Abstract: Fluoride contamination of groundwater is a growing problem in many parts of the world. The present study is an attempt to assess fluoride concentration of groundwater in parts of Kanchipuram district, Tamil Nadu. It was found that fluoride concentration ranged from 0.05-1.04 mg/L. If residents consume non potable high fluoride water they may suffer from yellow, mottled teeth – dental fluorosis. Therefore, it is essential to evolve regulations designated to improve the health and safety of the human and natural environment in the study area.

Keywords: Fluoride contamination, Groundwater, Kanchipuram

I. Introduction

Dyeing and printing of textile being a traditional industry of Kanchipuram town, a good number of textile industries along with dyeing and printing clusters have come up in the area. Water the Elixir of life is facing a severe threat due to pollution in Kancheepuram town which is located at a distance of 76 km from Chennai. The region is dependent on groundwater for drinking and irrigation purposes.

The processes followed in textile industries are spinning of fiber to yarn, sizing to improve stiffness, scouring and desizing to remove excess sizing materials, bleaching to remove pectin and wax from the yarn and fabric and colouring and printing to provide desired colour and design to the cloth. Dyeing is a combined process of bleaching and colouring, which generates voluminous quantities of wastewaters and in turn causes environmental degradation. The effluents consist of high concentrations of dye stuff, biochemical oxygen demand, total dissolved solids, sodium, chloride, fluoride, sulphate, heavy metals and carcinogenic dye ingredients [1].

Earlier studies by Kesavan and Parameswari (2005) revealed that the groundwater sources in Kanchipuram are not suitable for drinking purpose without proper treatment [2]. The problem of high fluoride concentration in groundwater resources has now become one of the most important toxicological and geoenvironmental issues in kanchipuram [3]. The present study was carried out to investigate the effect of dyeing industrial effluents on the quality of groundwater in and around the Kanchipuram town with reference its fluoride concentration.

II. Materials And Methods

Total of 13 groundwater samples (used for drinking purpose), from bore wells and dug wells, were collected in pre-cleaned plastic bottles from 9 selected areas of kanchipuram. About 500ml of water was collected in a clean dry polythene container and labeled with information like date of collection, source and place. Fluoride levels were analyzed by standardized analytical method by the Chief Water Analyst, State Level Water Testing Laboratory, Tamilnadu Water Supply And Drainage Board (TWAD), Government of Tamilnadu, Chennai (ISO 9001-2000 – certified).

III. Results

Table 1 shows the fluoride concentration in groundwater in various regions of kanchipuram collected between December 2013 and January 2014. It was found that fluoride concentration ranged from 0.05-1.04 mg/L.

Table 1 shows the fluoride concentration in groundwater in various sites of kanchipuram

Sample No.	Site of collection	Source of water	Fluoride concentration mg/L
S1	Chinna kanchipuram	Bore well	0.88
S2	Toll Gate	Open well	0.55
S3	Pulalur	Bore well	0.98
S4	Namunor	Borewell	1.04
S5	Kolivakkam	Open well	1.03
S6	Periya kanchipuram	Bore well	0.36
S7	Periya kanchipuram	Bore well	0.05

S8	Orikkai	Bore well	0.20
S9	Chinna kanchipuram	Bore well	0.59
S10	Toll gate	Bore well	0.37
S11	Selvulimedu	Bore well	0.20
S12	selvulimedu	Open well	0.26
S13	Pillarpallayam	Bore well	0.26

IV. Discussion

The present study is an attempt to assess fluoride concentration of groundwater in parts of Kanchipuram district, Tamil Nadu. It was found that fluoride concentration ranged from 0.05-1.04 mg/L. In the study conducted by Dar MA et al (2009) in kanchipuram showed that fluoride abundance in the range of 1 to 3.24 mg/L [3]. Pradeep kumar et al (2011) showed ground water contamination of fluoride releases from fertilizer plants in Ennore showed fluoride concentration in the range of 0.98 to 1.04 mg/L which is similar to this present study[4]. In a similar study done by Balakrishnan. et al (2008) in kanchipuram showed ground water contamination of fluoride in the range of 0.13 to 1.09 mg/L[5].

V. Conclusion

If residents consume non potable high fluoride water they may suffer from yellow, mottled teeth – dental fluorosis. Therefore, it is essential to evolve regulations designated to improve the health and safety of the human and natural environment in the study area.

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