

Heavy metal analysis in ground water samples of Sailu Tehsil

D.U. THOMBAL, R.U. AMBHURE and S.R. MIRGANE*

P.G. Department of Chemistry, Jalna Education Society's, R.G. Bagdia Arts,
S.B.Lakhotia Commerce and R.Bezonji Science, College, Jalna - 431203 (India).

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ABSTRACT

Determination of heavy metal concentration of selected Ten sites from Sailu Tehsil of Parbhani district was carried out. Heavy metals were estimated by Atomic Absorption spectrophotometer, and out come of the results were discussed in the light of pollution status of the study area.

Key words: Heavy metal Analysis ground water, Sailu Tehsil.

INTRODUCTION

Sailu is considered to be the oldest and religious city in parbhani district of Marathwada region in Maharashtra, Sailu city is situated near Dudhana river. A Famous Temple of "Keshavraj Babasaheb Maharaj" is situated in middle of sailu city. Who was Guru of Shirdis Sai baba.

The residents of Sailu tehsil usually use water from bore-well for drinking and domestic purposes. There is a huge variation in the concentration of different species due to factors like depth, different land, under groundwater conditions, rain conditions etc. The present work attempts to evaluate the quality of groundwater in sailu Tehsil of Parbhani district for potability.

MATERIAL

Material used

In the Present study Ten groundwater (borewell) samples were collected from different sites of Sailu tehsil in brown glass bottles with necessary precautions and preserved as per the recommended procedures¹. All the Chemicals used were of AR grade, Glass ware used were of 'A' grade. Double distilled water was used through out the work to prepare standard solution².

METHOD

Exactly 500 ml of each water sample was taken in clean, dry separating funnel. Exactly 25 ml

of Isobutylmethylketone (IBMK) and 2 ml of Ammoniumpyrolidinedithiocarbamate (APDC3) were added. The solution was shaken well, for 20 minutes and allowed for separation of organic and aqueous layer. Aqueous layer was discarded out. To the organic layer, 1 ml of 50% HNO₃ was added and allowed to settle and further the aqueous layer was collected and preserved for analysis of trace metals. The aqueous extract was made up to 25 ml, using D.D. water and analysed for heavy metal by using Atomic Absorption Spectrophotometer¹

RESULTS AND DISCUSSION

Heavy metals are the major category of toxic pollutants, distributed in water bodies, which have been extracted from earth's crust. The results obtained during the present investigation are tabulated in Table 1.

1. Cadmium - Is a rare element. It is considered to be one among the environmentally hazardous metal, because of its high toxicity and greater capability of accumulation and retention in the body of organism including human. In the present study, the Cadmium concentration ranges from 15 to 29 PPb, values are higher than permissible limit 10 PPb WHO⁴.
2. Chromium - It is naturally occurring element which is essential for good health i.e. synthesis of fat from glucose and also for the oxidation of fat to CO₂. In ground water chromium ranges from 8 to 16 PPb, some values are higher than permissible limit 10

- PPb according to WHO it is due to sewage in the study area.
3. Lead- It is highly toxic, the high concentration in potable water may causes cancer and blood pressure. High values in study area may be due to rain water run off, effluents and house holds sewage stagnation in and around study area and unplanned drainage system. The values ranges from 10 to 60 PPb below permissible limit 100 PPb according to WHO.
 4. Arsenic - It is well known Carcinogen. It is combine to nature by weathering reaction, biological activities and volcanic emission as well as anthropogenic activities. In the present study area arsenic ranges from 10 to 20 PPb. It is higher than the permissible limit.
 5. Copper - It is widely distributed heavy metal on earth crust. Total annual anthropogenic discharge of copper to surface water range from 35 x 10³ to 90 x 10³ metric tons per year. copper ranges from 20 to 106 PPb most of them are with in the permissible limit (100 PPb). High concentration of copper through water may causes epigastric burning, vomiting and diarrhoea.
 6. Zinc - It is essential metal which involved in synthesis of RNA and DNA. The total amount of Zinc discharged in the fresh water from anthropogenic Sources is estimated to be 77 to 373 x 10³ metric tons per year. It is ranges from 20 to 150 PPb in the study area with in permissible limit.
 7. Mercury - It is toxic element and serves no physiological functions in man i. e non essential element. The mercury ranges from 0 to 1 PPb which is in the permissible limit according to WHO.

Table 1: Heavy metal analysis in ground water samples of Sailu Teshil

Sample	Cd	Cr	Pb	As	Cu	Zn	Hg
1	18	8	60	10	93	70	0
2	20	11	30	12	60	150	1
3	29	15	10	16	56	20	0
4	26	12	15	14	59	80	0
5	23	11	10	11	106	50	0
6	28	10	20	12	50	120	0
7	22	13	40	16	30	40	1
8	15	16	30	20	20	60	0
9	21	12	10	10	20	30	0
10	27	10	20	20	30	20	1

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