Research Paper :

Physico-chemical analysis of selected municipal water samples of Ahmedpur and Latur town in Maharashtra

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ABSTRACT

The study was carried out by collecting two municipal water samples during July -10. The results were compared with standards prescribed by WHO and ISI 10500. Total 10 parameters were analyzed. In the present investigation, observed physico-chemical parameters are within the water quality standards and it is fit for drinking purpose.

The history of ancient civilization from it's growth and decline is inherently linked with the quantum of water supply. According to Bumgartnes and Reiches (1979) out of the total quantity of water in hydrosphere 97 per cent is in ocean and therefore non potable and only 3 per cent is fresh water out of which 77.23 per cent fresh water is in glaciers or ice caps, 9.86 per cent ground water at depth less than 800 m and 35 per cent ground water at depth between 800 m to 4 km only 0.03 per cent in rivers and lakes.

Water is an extra ordinary chemical compound of fundamental importance. The great scientist Cavendish in 1781 proved it for the first time that water is a compound of hydrogen and oxygen *i.e.* H_2O Chemically water consists of two parts of hydrogen and one part of oxygen by volume or 1 part of hydrogen and 8 parts of oxygen by weight. Water being a good solvent dissolves almost all substance which it comes in contact. So generally natural water is not pure. It contains impurities of various kinds of both dissolved and suspended there comprise dissolved gases Ex H_2S, CO_2, NH_3, N_2 dissolved minerals ex. salts of calcium, magnesium, and sodium suspended impurities Ex- Clay, sand, microscopic, organism. These are natural impurities derived from the atmosphere. catchments area and the soil normally such impurities, which are in low concentration that they do

not pollute the water, rather their presence is sometimes essential for maintaining the potable and other useful properties of water. Water is said to be polluted when it is changed in its quality or composition directly or indirectly as a result of waste disposal of human activities so that is becomes turbid having bad test, offensive odor less suitable for drinking and other purposes.

Among the most and basic natural resources fresh water is essential for survival of man. In India nowadays is rarely used directly fresh water is rarely used directly for drinking purposes as the water is contaminated with several impurities the domestic use of water may involve preliminary or advanced treatment of water and than takes to storage tanks for regular distribution to cities and industries.

In the present investigation the treated water of Municipal Corporation of Ahmedpur and Latur was analyzed to observe weather the water is acceptable for drinking purpose or not water samples are collected from the pipes of Municipal Corporation the month of July 2010 and 10 parameters are observed and compared with ISI 10500 and WHO specification.

EXPERIMENTAL METHODOLOGY

Ahmedpur and Latur cities are situated region of Maharashtra. The peoples are using tube well water as

well as municipal water for their daily need. According to literature survey, very rare work has been done regarding the water quality this region. Hence the present investigation was planned and undertaken.

Water samples were collected in two liter polythene bottles. Analysis was carried out for various water quality parameters such as pH, Ele. Cond., Total hardness, TDS, turbidity, TA, Ca, mg, sulfate, Cl, using standard methods [1,4,5]. The reagents used for the analysis were AR grade and distilled water was used for preparation of solutions.

EXPERIMENTAL FINDINGS AND ANALYSIS

The overall results of the physicochemical parameters for water samples are shown in Table 1.

pH:

pH value indicates acid – alkalinity range of water. It is affected by environmental factors such as temp. pH observed at S_1 is 7.6 and S_2 is 7.3. The values were within the maximum permissible limits, prescribed by WHO and Indian standards for drinking water.
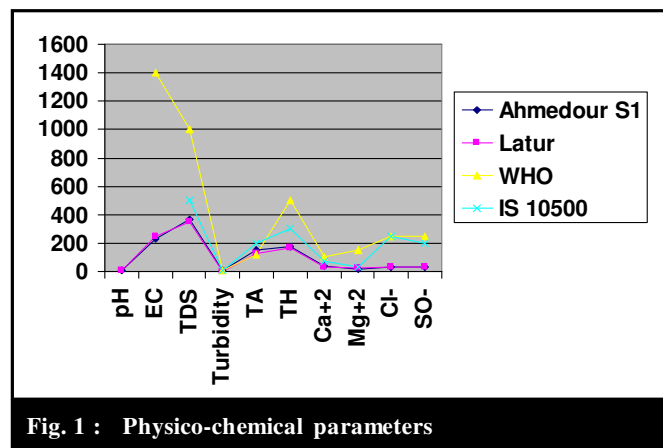

Fig. 1 : Physico-chemical parameters

Electrical conductivity (EC):

Electrical conductivity is the water capacity to convey electric current. It signifies the amount of total dissolved solids [8]. The values observed in this study at S_1 and S_2 are 231 and 248 m Mhos/cm, respectively. The values show that medium amount of dissolved inorganic salts.

Total dissolved solids:

Water containing 500 mg/l of TDS is not considered for drinking water supplies but in unavailable case 1500 mg/l is also allowed [9]. TDS values observed at S1 is 368 mg/l and S2 is 349 mg/l which and fit as in IS 10500 and WHO specification

Turbidity:

In the present investigation we found 4 NTU turbidity in S_1 water sample while 3.5 NTU in S_2 water sample. The both values are within the permissible limits of standard specifications. Rizwan Reza and Gurdeep Singh found turbidity within the permissible limit except Blinda village [7].

Total alkalinity:

Chemically pure water is neutral having equal amount of hydrogen and hydroxyl ion. The values observed are 152 mg/l at S_1 and 124 mg/l at S_2 which are within the permissible limit as per Indian standards but above the limits prescribed WHO.

Calcium and Magnesium:

Calcium concentration found 37 and 29 mg/l at station S_1 and S_2, respectively which is below permissible limit. Magnesium content in the investigated water sample was 19 mg/l and 21 mg/l which are close to permissible limit of Indian standard specification for drinking water.

Sr. No.	Parameters	Sampling stations		WHO	IS 10500
		Ahmedpur (S_1)	Latur (S_2)		
1.	pH	7.6	7.3	7 to 8.5	6.5 to 8.5
2.	EC	231	248	1400	–
3.	TDS	368	349	1000	500
4.	Turbidity	4	3.5	5.0	10.0
5.	TA	152	124	120	200
6.	TH	172	168	500	300
7.	Ca^{+2}	37	29	100	75
8.	Mg^{+2}	19	21	150	30
9.	Cl^-	31	28	250	250
10.	SO^-	34	28.5	250	200

Table 1 : Average results of physico – chemical parameters

All parameters are in mg/L except pH, EC and Turbidity, EC in µ mhos/cm, Turbidity in NTU

Chlorides (Cl⁻):

In present study the value of chlorides observed are 31 mg/l at S_1 and 28 mg/l at S_2 which are much lower as compared to permissible limits as prescribed by SIS and WHO. Mane and Pawar also observed lower values of chlorides in Mannar river water, Maharashtra [3].

Sulfates:

Sulfate occurs naturally in water because of leaching of some minerals. We noted 34 mg/l in S_1 water sample and 28.5 mg/l in S_2 water sample. Delphine Rose *et al.* (2) observed range of 11 to 123 mg/l in drinking water sample of Tamil Nadu.

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