



Assessment of Ground Water Quality of Beed City, Maharashtra, India

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ABSTRACT

Assessment of physicochemical characteristics of ground water of Beed city has been carried out using methods prescribed in APHA manual. Beed is a averagely populated city of the Maharashtra. Most of the domestic water requirements are fulfilled with various ground water sources. The physicochemical parameters like temperature, pH, alkalinity, salinity, acidity, Total hardness, Magnesium hardness, calcium hardness, chlorides, nitrite, Total Dissolved Solids, Dissolved oxygen, free Carbon dioxide were studied.

Key words: Ground water, Physicochemical Characters.

INTRODUCTION

Ground water is precious natural resource for several vital functions such as for public, industrial and agricultural water supply. It is the surface water that seeps into the ground. The water seep down through the fine gaps between sand particles displacing the air until it finds its level. The ground water acts as a reservoir by virtue of large pore spaces in earth materials. It is stored in Karstic, Fissured and porous aquifers. It provides drinking water to almost a third of the population and irrigates about 18% of the crop land.

Due to the increased demand the ground is being excessively exploited. The ground water is

used for domestic, industrial and agricultural purposes. Now a days ground water sources are observed to be affected of pollution and over exploitation, this presents a serious threat. Therefore it is essential to study the ground water quality. Many workers such as Tiwari and Manzoor (1989), Dayal (1992), Mittal *et al* (1994), Kataria (2000), Tripathi (2003), Meenambai (2006), Pawar (2005), had carried out studies on various ground water sources at different locations.

The present work is undertaken to study the physicochemical characteristics of the ground water from Beed city. Beed is a district head quarter, with a population of about 400,000. Most of the population relies on various ground water sources

like Dug wells; Bore wells etc. for their water requirements. The physicochemical characteristics such as temperature, pH, alkalinity, salinity acidity, Total hardness, calcium hardness, chlorides, nitrite, Total Dissolved Solids, Free Carbon dioxide, Dissolved Oxygen were studied on the water samples collected from ground water sources (borewells).

Methodology

The samples were collected from ten (10) different locations situated at different geographical locations in the city, the site selection is made randomly. Samples were collected from every sampling station and analysed by following APHA manual.

RESULTS AND DISCUSSION

The physicochemical parameters recorded are given in the table 1. Water temperature is the most important factor of the water which has a great deal of influence on various chemical and biological reactions taking place in the water. The water temperature ranged between 28° C to 30° C in all the stations sampled. The pH values of all the samples were found in the range of suitable drinking water standards. Alkalinity is imparted by salts like

carbonates, bicarbonates, nitrates. The alkalinity ranged between 175 to 425 mg/liter with maximum being at Aziz pura tube well (425 mg/liter) and minimum being at Maheboobganj bore well (175 mg/liter). Acidity is caused by mineral acids, salts and Carbon dioxide. Acidity ranged between 66 mg/liter to 203 mg/liter with highest being at Bale Peer bore well (203 mg/liter) and minimum being at Maheboob ganj. Calcium hardness was found to be maximum at Balepeer bore well (108 mg/liter) and minimum at Maheboob ganj (32 mg/liter). The Magnesium hardness was found to be maximum at Hafiz galli bore well (117 mg/liter) and minimum at Maheboob ganj bore well (16.59 mg/liter). High chloride level indicates pollution from domestic sewage. Chlorides were found maximum at Masarat nagar (351.45 mg/liter) and minimum at Maheboob ganj bore well (49.7 mg/liter). Salinity was found maximum at Masarat nagar (634.397 mg/liter) and minimum at Maheboob Ganj (89.738 mg/liter). Natural water contains higher level of sulphates due to weathering of rocks. Sulphates were found maximum at Shahinshah Nagar (260 mg/liter) and minimum at Hafiz galli bore well (40 mg/liter). Presence of small quantity of nitrite indicates organic pollution. Nitrites were found maximum at Maheboob ganj bore well (0.625 mg/liter) and maximum at Azizpura bore well (0.05 mg/

Table 1: Physico-chemical characteristics of ground water samples of beed city of Maharashtra

Parameters	MCC	AP	SR	BP	MC	MSN	MJ	SHN	HG	SPO
Temperature (°C)	28	29	30	29	28	28	30	28	28	30
PH	7.52	7.13	7.25	7.25	7.1	8.61	7.73	6.74	6.85	7.13
Alkalinity	325	425	265	360	350	305	175	340	300	300
Acidity	165	198	132	203	99	165	66	198	99	165
Total hardness	240	240	330	440	132	186	100	460	540	340
Mg hardness	22	47	58	72	21	35	16	94	117	70
Ca hardness	60	48.8	92	108	48	36.8	32	78.1	60.1	52.1
Chlorides	71	80.94	71	109	65	351	50	166	142	146
Salinity	128	146	128	197	117	634	89	300	256	263
Sulphates	65	80	190	75	75	250	40	260	40	50
Nitrites	0.5	0.05	0.25	0.05	0.16	0.55	0.62	0.5	0.1	-
TDS	3050	4450	6400	6250	1800	4800	3350	3650	1200	1800
Free CO ₂	58	87.12	87.12	58.08	87.12	58.08	22.41	174	58	87
DO	4.16	4.58	4.5	10	13.05	6	6.25	4.16	3.54	3.54

All parameters are expressed in mg/l except temperature and pH.

MCC-Milliya campus, AP-azizpura, SR-subhash road, BP-Balepeer, MC- Masoom colony, MSN-Masaratnagar, MJ-Maheboobganj, SN-shahensahnagar, HG-Hafizgalli, SPO-S.P.office

liter). Total Dissolved solids were found maximum at Subhash road bore well (6400 mg/liter) and minimum at Masoom Colony bore well (1800 mg/liter). Ground water used for drinking purpose is rich in carbon dioxide because it come from percolation through various strata and it absorbs a large amount of carbon dioxide. Free Carbon dioxide was found maximum at Shahinshah Nagar bore well (147.24 mg /liter) and minimum at Hafiz galli bore well (58.08 mg/liter). Dissolved oxygen is one of the most important parameter in assessing water quality and reflects physical and chemical processes

prevailing in the water. Dissolved Oxygen was found maximum at Masoom Colony (13.05 mg/liter) and minimum at Hafiz galli bore well (3.054 mg/liter).

The physico - chemical analysis of ground water samples in Beed city reveals that most of the parameters were found within permissible limit except nitrite concentration. Areas BP, MSN, HG, SHN appears to be fairly polluted water samples may be potable after proper treatment. However monitoring is important to detect drinking water contamination.

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