

## RESEARCH ARTICLE

## The effect of effluent on groundwater surrounding to the village area Bhoyar, taluka and district Yavatmal (MS) India.

Jadhao RG

Department of Zoology, Shri Shivaji Science College, Amravati. (MS) India.

Manuscript Details	ABSTRACT
<p>Received : 08.08.2014            Revised : 19.10.2014            Revised Received : 02.11.2014            Accepted: 31.12.2014            Published : 22.01.2015</p> <p><b>ISSN: 2322-0015</b></p> <p><b>Editor: Dr. Arvind Chavhan</b></p> <p><b>Cite this article as:</b></p> <p>Jadhao RG. The effect of effluent on groundwater surrounding to the village area Bhoyar, taluka and district Yavatmal (MS) India.. <i>Int. Res. J. of Sci. &amp; Engg.</i>, 2015; 3 (1):15-17.</p> <p><b>Copyright:</b> © Author(s), This is an open access article under the terms of the Creative Commons Attribution Non-Commercial No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>The industrial waste from Maharashtra Industrial Development Corporation area of the Yavatmal city is towards the village Bhoyar located towards west about two km. away . A small nalla located about 100mt. distance from the village Bhoyar, where effluent that is industrial sewage is discharged and resulting to precipitate the chemical in the nalla water.</p> <p>The village Bhoyar located in hard rock area and main aim of study is whether the water gets percolated or not in to the groundwater. Then how does it affects the quality of the nalla water?. This paper is totally based on result of chemical analysis of water samples both surface and groundwater.</p> <p><b>Key Words:</b> Effect of Effluent, Village Bhoyar.</p>
	<p><b>INTRODUCTION</b></p> <p>The improper management is the main cause of this serious environmental problem in terms of air, water and land. The nature of pollutant can classified as biological, chemical and radioactive. Water is the basic requirement not only mankind but also animal and plants for survival. Apart from its use for domestic purpose, it is used on large scale in agriculture and industries. But water quality is an important requirement irrespective purpose of it is made for use. Due to industrial advisement have result in to detonation of water quality. This is not only applicable for surface water but also groundwater. The problem associated with water quality of both surface water and groundwater originates from inadvertent disposal of waste in to the near water body.</p> <p><b>Location:</b></p> <p>The village located on Yavatmal- Darhwa road approximate 5km. away from Lohara Crossing point (78°4'25"20°22'25"), is about 7km away from Yavatmal city.</p>

**Physiography and Drainage:**

The village is located topographic high area with gentle slope towards south. A small streamlet located about 100mt.distance towards east, the nalla is seasonal. The village located about 411.70mt.above mean sea level. Due to effluent of industrial the stream becomes perenial.

Rainfall and Climates: The rainfall is uneven distributed in the district. The average rainfall varies from 650mm. to990mm, almost all the precipitation is between month of June to September.

The climate is divided into four season. The cold season prevail from December to February followed by the hot season from March to May. The diurnal temperature ranges from a minimum 8°C in winter(January) to maximum of 45°C in (May).

**Geology and Hydrogeology:** The village is covered hard and compact massive basalt.The surface geology as follows.

Sr, No.	Types of Rock	Depth in Meter
1	Soil and weathered Basalt	0-5
2	Hard impervious basaltic flow	5-29
3	Zeolite bearing vesicular basalt	29-51
4	Hard impervious basaltic flow	51-66
5	Zeolite bearing basaltic flow	66-87
6	Hard impervious basaltic flow	87-95

The bore well was drilled in the year1978-79 and was yielding 2250 lph at the depth 12mt during drilling. But at 40 to 50mt. depth, the yield was found reduce tremendously, and after completing bore well ,the depth of 52mt.it was found that the water level has gone down to the depth of 52mt. In such situation, it is impossible to install the hand pump as well as power pump due to deep water table. The first and only one positive aquifer at 12mt. was found.

After investigation, there is a hungry zone in compact basalt at the depth 40 mt. to 50 mt. where water from aquifer was going out from the bore well to the hungry zone. For sealing off the hungry zone, cement was used which block the passages and regaining the water level up to 20 mt., as well as yield.

**MATERIAL AND METHODS:**

The water samples were collected from the hand pumps in the village while the sewage water from nallas nearby the village and stored in the polythene bottles. Thereafter, brought to the laboratory for further chemical analysis.The chemical analysis of water samples was carried out at Public Health Laboratory, Yavatmal.

**RESULTS AND DISCUSSION**

Physicochemical analysis of Ground water is deflected in table no. 1.

**Table 1: Chemical analysis of water**

Sr. No	Location	HP/DW	pH	Cond .	Alk	TDS	Hard .	Cl	SO4	NO3	Ca	F	Fe	Analysis
1	H/O M. Kadam	HP	8.8	416	140	640	---	268	55	2	--	0.40	0.0	*2002
2	H/O M Kadam	HP	7.6	554	124	363	124	40	14	8	72	0.4	1.4	**28-11-2002
3	H/O H. More	HP	7.1	351	272	540	--	74	44	22	--	0.45	1.48	*2002
4	H/O H.More	HP	7.4	828	48	542	140	224	59	2	48	0.4	1.20	**28-11-2008
5	H/O S. Chaudhari	HP	6.9	247	272	380	--	20	27	22	--	0.30	0.95	*2002
6	H/O R Patil	DW	7.0	384	348	590	--	84	50	6	--	0.30	0.05	*2002
7	Effluent of Nalla Water	Nalla	7.3	294	376	452	336	1076	--	55	--	0.8	0.41	**28-11-2008

\*Analysis reported by National Environmental Engineering Research Institute , Nagpur. (2002)

\*\*Analysis carried out at Public Health Laboratory, Yavatmal (28-11-2008).

In case of Bore well water, pH ranges from 6.9 to 8.8 showing alkaline nature while in case of dug well water it is 7.0 shows neutral nature. But nalla water has pH 7.3 which shows alkaline nature. In case of Bore well water, Alkalinity ranges from 48 to 272 ppm while that of dug well water is 348 ppm, and Nalla water is 452 ppm. The Conductivity ranges from 554 ppm to 828 ppm in case of bore well, while that of dug well water, it is 384 ppm and nalla water is 294 ppm. Total dissolved salts – Ranges from 363 ppm to 640 ppm in case of bore well, that of dug well 590 ppm, and nalla water is 452 ppm. Hardness – It ranges from 124 ppm to 140 ppm in case of bore well and 336 ppm of nalla water. Calcium – It ranges from 48 ppm to 72 ppm in case bore well. Fluoride – It ranges from 0.40 ppm to 0.45 ppm in bore well water, 0.05 ppm in dug well water and 0.80 ppm in Nalla water. Iron – It ranges from 0.95 ppm to 1.48 ppm in bore well water, 0.05 ppm in dug well water and 0.41 ppm in Nalla water. Chloride – Chloride ranges from 20 ppm to 268 ppm in bore well water, 84 ppm in dug well water and 1076 ppm in Nalla water. Sulphate – It ranges from 14 ppm to 60 ppm in bore well water and 50 ppm in dug well water. Nitrate – It ranges from 2 to 22 ppm in bore well water, 6 ppm in dug well water and 55 ppm in Nalla water. The Chloride (1076 ppm) was recorded from Nalla water is more than permissible limit and that of Iron recorded (1.20 ppm to 1.48 ppm) from Bore well water is also more than permissible limit. The Nalla water having greenish blue colour and dirty Odour. The rest of the parameters are found to be within limit.

### REMARK AND RECOMMENDATION

- The greenish blue colour of Nalla water is due to effluent Industrial waste.
- In past, the nalla was seasonal. Now it became Perennial due to continuous discharge of Industrial waste.
- The chemical quality of nalla water is not suitable for irrigation and drinking water purpose.
- Due to hard rock, water from nalla doesn't percolate into the ground water.
- The chemical quality of nalla water is different than ground water of bore wells and dug wells.
- The bore well water and dug well water is potable.
- The iron content in bore well water is more than one ppm in situ. Due to high leaching from parent rock.
- The cavity present at the depth of 40 to 50 mts. below ground level but due to lack of percolation of surface water into ground water hence, no contamination in deeper aquifer.

- The deeper aquifer having lateral variation which is completely protected from contamination.
- Wells which located on the bank of nalla gets polluted reported by villagers.
- Due to hard rock, stone quarry and stone crusher machinery working surrounding the village.
- The village having water supply from dug well located on upstream direction through pipeline, hence no percolation of nalla water.
- The villagers should not use nalla water for domestic, drinking and irrigation purpose because the quality of water is not good.
- The thick vegetation present along side of nalla indicates no chemical effect on vegetation.
- No effect of surface water to the ground water. Hence the ground water of bore well and dug well is suitable for drinking purpose.

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