Impact of sugar industry effluents on the quality of ground water from Dahiwad Village, Dist-Dhule(M.S.)

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ABSTRACT

The assessment of Ground water quality of Sugar industry from Dahiwad village analyzed, It is utilized for drinking and domestic purposes, hence it is need to assess the quality of ground water. The effluents of ground water in the vicinity of a sugar industry in Dahiwad Dist- Dhule, Maharashtra, were studied during Jan. to Oct. 2008, from water. In this study the different parameters of ground water was studied from sugar industry. The Parameters like DO, hardness, alkalinity, Magnesium, Nitrate, Phosphate , Chloride, Sulphate , PH , were estimated to assess the impact of effluents on ground water. The results revealed that there was a significant variation in same parameters. The PH 7 to 8.5 mg/l, Hardness 300 to 500 mg/l, Nitrates 35 to 55 mg/l, Phosphate 0.13 to1.5mg/l, Magnesium 30 to 50 mg/l. , Chloride 250 to 340 mg/1. The water in the study area was affected due to higher values of Chloride, Phosphates, Nitrates, Magnesium and hardness in water of Dahiwad village..
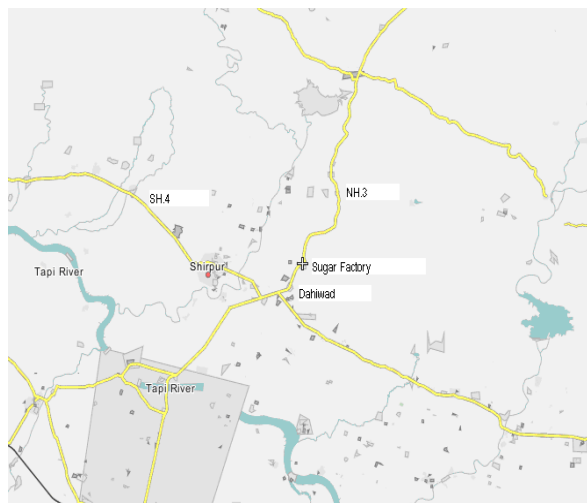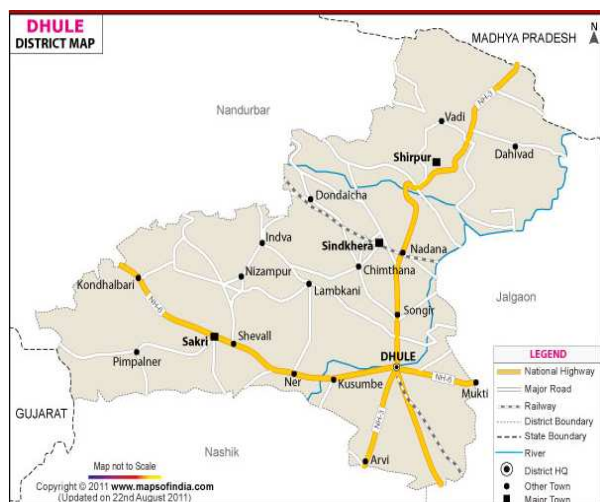
Key words: Dahiwad village, Sugar Industry, Effluents, Water quality, Water Pollution
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INTRODUCTION

Water is very important life supporting material and required for all biotic communities. We depend on water for domestic needs, irrigation, sanitation and disposal of wastes. Normally water in nature is never pure in chemical sense. In Water natural impurities are in very low amounts, but due to rapid industrialization, over population, indiscriminate use of chemicals causing water pollution and over exploitation of ground water disturbs the state of equilibrium of aquifer. Sugar industries play a vital role in the development of Indian economy . In spite of the fact that sugar industry creates ecological problems associated with it such as water, air and soil pollution. The effluents coming from industries, some time percolates through subsoil and reaches the ground water table forming contaminated pool. Which disturb the natural ground water quality by changing it's chemical composition (Pondhe et.al.1992). In addition to 45 million people are annually affected by poor quality water. In present study it is identified that major source of ground water pollution in the study area.

Study area:
The sugar factory is situated 7Km.away from Shirpur. The effluents was collected from Shirpur shetkari Sahakari karkhana in the vicinity of Dahiwad village situated 2Km. away from sugar factory at the side of National highway Mumbai-Agra number -3 (NH-3) Shirpur taluka,Dist-Dhule, Maharashtra, India.

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MATERIALS AND METHODS

The sample of sugar industry effluents was collected from Shirpur shetkari Sahakari karkhana in the vicinity of Dahiwad village situated at the side of national highway number 03 (Mumbai-Agra) Shirpur taluka,Dist-Dhule, Maharashtra, India. Water sample were collected and brought to the laboratory and stored at $4^{o}C$., on a monthly basis for the period of 10 month from Jan. to Oct.2008 .Sugar industry effluents collected in clean polyethylene bottles and immediately transported to the laboratory for the estimation of various Physico-chemical properties viz. pH and dissolved oxygen were recorded at site where as the other parameters like nitrates, chlorides, magnesium, potassium, phosphate, hardness were estimated in the laboratory by using standard method for the estimation of water given by APHA (1998) .

RESULTS AND DISCUSSION

The result of water quality status is depicted in table. In the present study water pH value ranged from 7.1 to 8.5 .it was minimum 7 in the month of Feb and maximum 8.5 during July 2008 . The chloride contents varied from 250 to 340 mg/l indicating the polluted status of the water body. The maximum value was recorded in May and Oct.,while minimum was recorded in Feb. Adoni (1985) attributed high chloride values. The phosphate values ranged between 0.9 to 1.5 mg/l. The maximum nitrate was observed as 55 mg/l and minimum as 35 mg/l. Nitrate is higher than WHO permissible limit can cause the health problem (Amathussalam, A. et.al.2002) The sulphate fluctuated between the 7 to 24 mg/l. The similar trend was observed by Poonam Nomulwar and P.M.Patil (2005). The level of magnesium varied between 30 to 50 mg/L; at higher concentration it increases total hardness of water. Most of the parameters during the present study do not meet the water quality norms as per BIS (1990). Now it is clear that the ground water becomes polluted due to sugar industry effluents from surrounding areas. Hence, it is not suitable for human consumption without prior treatment. Moreover, the water is used for irrigation and domestic purposes in that area. In the present investigation it was observed that the sugar industry effluents have effect on the ground water quality. On the basis analysis it can be said that the ground water in the vicinity of sugar factory was contaminated due to higher concentration of chlorides, nitrates, magnesium and total hardness which was higher than BIS (1990) standards for drinking water.

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Table 1 BIS(1990) standards for drinking water (mg/L).

Parameters	Acceptable	Maximum
pH	**7.0-8.5**	**6.5-9.5**
Turbidity,NTU	**5-10**	**-**
Chloride	**200**	**1000**
Alkalinity	**200**	**600**
Total hardness	**200**	**600**
Calcium	**75**	**200**
Magnesium	**30**	**-**
Sulphate	**200**	**400**
Nitrite	**0.02**	**-**
Nitrate	**45**	**100**
COD	**-**	**-**
Iron	**0.3**	**-**
Fluride	**1.0**	**-**
TDS	**500**	**1500**

Table 2 Physico-chemical Status of Ground Water from Dahiwad during Jan to Oct. 2008.

Sr. No	Parameters	Jan	Feb	March	April	May	June	Jully	Aug	Sept.	Oct.
1	pH	7.2	7.1	7.9	7.5	7.5	8.3	8.5	7.2	7.1	8.1
2	Nitrates	35	38	40	50	45	35	55	43	48	53
3	Chlorides	300	250	330	250	340	330	340	260	260	340
4	Sulphates	20.3	24	15	20	8	11	8	7	6.5	10
5	Phosphates	0.11	0.15	0.13	1.2	0.9	1	1.5	0.18	1.4	1.1
6	Total Hardness	320	400	335	425	300	500	450	400	450	350
7	Magnesium	35	40	50	30	45	30	30	45	50	40
8	Alkalinity	300	200	350	400	500	400	450	300	350	250

All parameters are expressed in mg/lit except pH

Acknowledgement

REFERENCES

[1] Amathussalam, A. M.N Abubacker and N. Jaybal, (**2002**) *J.Industrial pollution. Cont.18(2): 119-124.*

[2] APHA (**1990**), Standard method for the estimation of water, sewage and industrial waste.

[3] Behera, B; Reddy, V.R. (**2002**) *Economics & Political Weekly (37) 3: 257- 625.*

[4] BIS (**1990**), Drinking water specification IS10500 BIS New Delhi.

[5]David,A. and P.Ray (**1981**) *Env.Hlth.vol.VIII;6-35.*

[6] Ewa,E E, Iwara, A I. (**2011**) Impact of Industrial Activities on water quality of <u>*Omoka creek – Vol*</u> I ; 8-16

[7] Pondhe, G.M.,S.F.Patil and J Dhambare(**1977**) *Journal of pollution research ; 191-195*

[8] Jesudas, louis and R. Akila, (**1996**) *IIEV protection vol-16, No. 11; 808-810, Kalpana corporation.*

[9] Dr. A.S. Kolhe, Ingle S.R., & Sarode A.G. *International Research Journal ISSN 0974-2832., pages 307-311*

[10]Senthil kumar , R.D., R. Narayanana Swamy , K. ramkrishanan (**2001**) *Poll. 20(I); 93-97,*

[11] Patel N.G. and Lohar P.S. (**1998**), *J.aqua.biol.* vol.13 (1& 2) 57-59.

[12] Ravi Kumar, M; Manjaapp, S;Kiran,B.R &Puttaiah,E.T; - *J Aqua. Biol.* 20 (2) **2005**; 117-120.

[13] Sharma B.K. (**2001**) A tezxt book of Environmental chemistry.

[14] Poonam Nomulkar and P.M.Patil *J.Aqua-Biol.*, Vol.20(1) **2005**: 45-48

[15] Subha Rao, N; Guranandha Rao (**1998**) *Indian journal of Environment Protection* 19(4) 241-244.

[16] Subranhmanyam, K: Yadaiah P.(**2011**) *Hydrogeology Journal 9(3) 297-312.*

[17] Nagendra Kumar Chaurasia & Ram Krishna Tiwara . (**2012**) *Annals of Biologisal research 2012,3 (9); 4406-4408.*