STUDY OF CHLORIDE CONCENTRACTION FROM DIFFERENT LABORATORY SEWAGE WATER IN GADHINGLAJ TAHSIL, MAHARASHTRA

Shobha Jadhav[1], Ashvin Godghate[1] and Rajaram Sawant[2]
[1]Department of Chemistry, Dr. Ghali College, Gadhinglaj.-416502
Dist.-Kolhapur (M.S.) India
[2]Department of Botany, Dr. Ghali College, Gadhinglaj.-416502 Dist.-Kolhapur (M.S.) India
E-mail: shobhajdhv120@gmail.com (*Corresponding Author*)

Abstract: The present study reveals the pollution status of laboratory sewage water of Gadhinglaj tahsil (Kolhapur dist.) form Maharashtra. Gadhinglaj is located at latitude 16^0 13' 26" N and longtiude 74^0 26' E. Gadhinglaj tahsil comprises 90 villages. The population of Gadhinglaj is 216257. The samples were collected from six different college science laboratories during September 2014. In this investigation the physico-chemical parameters like, pH, EC, alkalinity, total hardness, calcium, magnesium, chloride has been analyzed. The result shows variations in physico-chemical parameters site to site and compared with (WHO 1994). In present investigation pH is slightly alkaline in all samples. The chloride value ranged between 198.8 mg/L to 454.4 mg/L. All sites have higher chloride values. This lab sewage directly connected to drainage. Drainage water released in the river. Therefore river water get polluted.
For avoid pollution proper treatment should be done before release in drainage system.
Keywords: Laboratory sewage, chloride concentration, pollution, Gadhinglaj city.

Introduction

Water is essential for survival of any form of life. Surface and ground water are the only major sources of water to meet out the entire requirement. They get contaminated in many ways. Sewage, industrial wastes and a wide array of synthetic chemicals also pollute water (Anadhaparameswari *et. al.*, 2007) Pollution is cause when a change in the physical, chemical, biological condition in the environment harmfully affect the quality of human life including other animals life and plants (Lowel and Thompson, 1992, Okoye *et. al.*, 2002). Industrial, sewage, municipal wastes are been continuously added to water bodies hence affect the physico-chemical quality of water making them unfit for use of livestock and other organism. (Dwivedi and Pandy, 2002). The sewage problem is common among developed and developing countries with population explosion, urbanization, industrialization and other

anthropogenic activities on an average 9 gm of nitrogen and 2 gm of phosphorus per person per day generates as domestic waste (Kumara and Belagali, 2009).

Materials and Methods

  Study area: Gadhinglaj is near about 70 kms away from Kolhapur. Near about 85% of drainage is open. The sewage water from all sites is directly discharged in Hiranyakeshi river and some tanks were constructed directly on the sewage line for irrigation. Laboratory sewage samples were collected (separately in 1 liter polythene bottles) in the month of September 2014 from different 6 sites (Table No. 1) physico-chemical parameters were estimated as per standard procedures given in APHAAWWA (2005) and Trivedi and Goel (1984).

Result and Discussion

  The result of present investigation were reported in Table 1.

1) pH: The pH was ranged between 6.66 to 6.89. The highest was observed at site VI and lowest at site I pH is slightly lies below the alkaline in all samples. Hashmi Imran (2005) reported that the pH of water sample generally towards acidic side. At low pH most of metals become soluble and become available, therefore could be hazardous in the environment.

2) Electrical Conductivity: The electrical conductivity ranged between 0.63 mhos/cm to 2.77 mhos/cm. The minimum electrical conductivity was recorded at site V while maximum at site IV. Conductivity gives an idea of the total solids content of water.

3) Total Hardness: Total Hardness ranged between 130 mg/L to 230 mg/L. It was highest at site I while lowest at site II. Present study revealed that all the samples are with moderate values. **4) Calcium:** Calcium ion concentration of laboratory sewage water samples ranged between 60.15 mg/L to 144.36 mg/L. It was highest at site IV and lowest at site III.

5) Magnesium: Magnesium ion concentration ranged between 4.30 mg/L to 36.37 mg/L. It was highest at site I and lowest at site II. The total hardness is due to presence of divalent cations of Ca and Mg are the most abundant in ground water. Jain *et. al* (1998) reported that high concentration of hardness (150 to 300 mg/L and above) may cause kidney problems.

6) Alkalinity: Alkalinity ranged between 50 to 100 mg/L. It has estimated highest site I and lowest site were V and VI. In general, alkalinity should not be less than 30 mg/L and 400 - 500 mg/L are considered to high. Alkalinity in waste water results from presence of carbonate and bicarbonates. Alkalinity represents the buffering capacity of water and its ability to resist change in pH.

7) Chloride: The chloride ranges between 198.8 mg/L to 454.4 mg/L. It was highest at site IV and lowest at site VI. Such sewage water is released in river. The river water get polluted. Chlorides are generally present in natural water. The presence of chloride in natural water can be attributed to dissolution of salts, deposits discharge from effluents from industrial and domestic wastes (Kavitha *et. al*, 2012) According to WHO (1984) standards permissible limits of chlorides is 250 m/L. The excess amount of chloride in drinking water may induce heart failure (Brooker and Johnson, 1984) and hypertension (Hussain and Ikbal, 2003). Chloride in excess imports a salty taste to water and people who are not accustomed to high chloride may be subjected to laxative effect. High chloride concentration is also an indicator of large amount of organic matter (Yadev, G., 2002), Adoni *et. al* (1985) have reported that chloride content above 60 mg/L indicate heavy pollution.

Conclusion

The findings of the present work are also recommended that there is variation in physico-chemical parameters of different laboratory sewage water. Chloride value recorded higher amount at all sites. The lab sewage water is released into river. River water get highly polluted it affects on aquatic ecosystem and shows negative effect on water quality of the receiving water bodies. Therefore the polluted water is not suitable for domestic and drinking purpose. It is therefore recommended that the careless release of laboratory sewage without pretreatment should be discouraged.

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Table 1: Physico-chemical parameters at different laboratory sewage water of Gadhinglaj Tahsil

Site No.	Name of College	pH	E.C.	Total hardness	Ca. hardness	Mg. hardness	Alkalinity	Chloride
I	Sadhand College	6.66	0.752	230	80.30	36.37	100	426
II	Shivraj College	6.82	1.38	130	112.28	4.30	70	323.76
III	Dr. Ghali College	6.72	2.56	140	60.15	19.40	90	448.52
IV	Vivekanand College	6.70	2.77	210	144.36	15.95	90	454.4
V	Nesari Nursing College	6.82	0.63	150	80.2	16.96	50	221.52
VI	B.Pharm. Hasurwadi College	6.89	0.62	220	80.2	33.97	50	198.8

Note: All values are in mg/L except pH & EC mmhocm^{-1}

Table 2: Drinking water samples of WHO (1963) & BIS (1991) ISI

Sr. No.	Parameters	WHO		BIS		ISI	
		General Allowable	Acceptability Limit	General Allowable	Acceptability Limit	General Allowable	Acceptability limit
1	pH	7 to 8	6.5 to 9.2	7 to 8	6.5 to 9.2	9.0-8.5	6.5-9.2
2	E.C.	300	----	300	----	----	----
3	Total Hardness	500	----	500	----	200	600
4	Calcium	75	200	75	200	75	200
5	Magnesium	50	150	50	150	50	150
6	Chloride	200	600	200	600	200	600
7	Alkanility	75	200	----	----	200	600
8	D.O.	4 to 6(ppm)	3(ppm)	4 to 6(ppm)	3(ppm)		

Site No. 1: Sadhana College

Site No. 2: Shivraj College

Site No. 3: Dr. Ghali College

Site No. 4: Vivakanand College

Site No. 5: Nesaring Nursing College

Site No. 6: B. Pharma College