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POLLUTION STATUSAND SEASONAL VARIATION IN PHYSICO-CHEMICAL PARAMETERS OF DOMESTIC SEWAGE AT UDGIR

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ABSTRACT

In Present investigation, an attempt has been made to investigate the pollution status of domestic sewage at Udgir. The Study of Physico-chemical parameters viz, temperature, PH, Electrical conductivity (EC) ,Total Dissolved Solids (TDS), Total hardness (TH), Dissolved Oxygen (DO), Sodium, Potassium, Sulphate, Phosphate were investigated. The result shows that seasonal variation in physico-chemical parameters.

Key words: Seasonal variation, Physico-chemical parameters, Domestic

INTRODUCTION

Water is the essential part of human life and ecology on earth. It is one of the most valuable resources available to man for his domestic, agriculture and industrial uses. Out of which agriculture claims lion's share for about two third of water demand. With population growing at an annual rate of 1.6 per cent, while irrigation is expanding at the rate of about one per cent only. Shortage of water is being experienced in many part of the world especially in arid and semi arid regions. Since intensive agriculture cannot depend on rainfall alone, sewage water as well as low quality water resources may become immense important sources of water in areas where other sources inadequate.

Utilization of water resources is crucial to agricultural production for meeting the ever increasing demand of irrigation water for producing more and more food. Since resources are limited and large gap exists between available water supply and Amount required, appropriate use of waste water of domestic origin can help in meeting a part of increased demand of water for crop production. Industrial and domestic effluents with solid and liquid sewage components are being used for irrigation. Therefore it is essential to investigate thoroughly the quality and composition of waste water.

MATERIAL AND METHODS

Study area: The study area selected was Udgir which is the Taluka headquarter in Latur district of Maharashtra. The town is having a big commercial center and there small scale industries like oil mills, pulse mills etc. Water is mostly used for washing, Bathing and cleaning purposes. Therefore sewage mostly comes under the category of domestic sewage.

The present investigation was carried out by collection of sewage water samples from two different sites (sample 1 and sample 2). The well water sample as control (sample 3) was also collected. These water samples were collected in polyethylene bottles, labeled properly and analyzed for their physico-chemical parameters. The parameters like Temperature, PH, Electrical conductivity (EC), TDS, Total hardness (TH), Dissolved oxygen (DO), Sodium, Potassium, Sulphate, Phosphate were analyzed in the laboratory using standard methods (APHA 1985).

RESULT AND DISCUSSION

The results of analysis were reported in table 1

Temperature – The maximum temperature of 34^{o}c was recorded during summer season in sample III and minimum as 23oc during rainy season in sample I and II. The variation in water temperature may be due to different timing of collection and influence of season. These values were within WHO standard limit of 40oc for irrigation purpose.

P^{H} - The PH of sewage water as well as control samples was alkaline in nature. The PH values of the study samples were lower during rainy season and the values started gradually increasing during winter season and reached maximum in summer season. The PH of sewage water samples and control samples were within safe limits of 6 to 8.5 for irrigation as per suggested by WHO (1984).

Electrical Conductivity -The EC of water samples ranged from 300 to 780µscm-1.The maximum value of EC recorded was 780µcm-1 in samples II during summer season and the minimum value of 300 µscm-1 in sample I and III during rainy season. It was observed that the higher concentration of conductivity in summer season while lower values were observed in rainy season thus the EC values of water samples was within
the prescribed standard limit as per (1000 µscm-1) WHO (1984)

Total dissolved solids (TDS) - The total dissolved solids of water samples ranged from 450 to 2000 mg/L. The minimum value of TDS 450 mg/L was observed in sample III (control). While the maximum value of TDS i.e. 2000 mg/L was noted in sample I during summer Season. The TDS value is below the recommended maximum concentration of 2000 mg/L for irrigation purpose given by WHO (1984).

Dissolved Oxygen (DO) - The maximum value of DO was noted as 26 mg/L in sewage water sample II in rainy season while the minimum value of 3 mg/L was recorded during summer season. The values of dissolved oxygen content of sewage water sample I and II were above the standard limit (5 mg/L) as per WHO (1984) whereas in control sample, the values are within the safe limit as per WHO (1984) except DO content in rainy season.

Total hardness (TH) - The maximum value of total hardness as 560 mg/L was recorded in sewage water sample I during summer season. While the minimum value of total hardness as 140 mg/L in control sample III during rainy season. From the result it was observed that the values of total hardness are higher in summer season and lower in rainy season. The total hardness concentration was above the desirable limit (1000 mg/L) as suggested by WHO (1984).

Sodium – Maximum sodium content of 9.4 meq/L was recorded in sewage water sample II during summer season. While minimum of 4.6 meq/L in control sample III during rainy season.

Potassium – Potassium content of water sample ranged from 0.3 to 0.8 meq/L.

Sulphate – Sulphate concentration was higher in summer season (47.2 mg/L) and lower in winter season in all water samples (19 mg/L). Discharge of domestic sewage and industrial waste in water tend to increase the concentration of sulphate.

Phosphate – The phosphate content of water samples are within the prescribed limit of 5 mg/L as per suggested by WHO (1984). Higher phosphate content (2.9 mg/L) during rainy season and lower during winter season.

CONCLUSIONS

The various parameters are within the prescribed as per WHO (1984) in the study period. The findings of the present work are also recommended that there is variation in physico-chemical parameters and water sample is suitable for irrigation purpose.

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TABLE-1 PHYSICO-CHEMICAL PARAMETER OF DOMESTIC SEWAGE AT UDGIR

Parameter	Water samples									WHO Std. (1984)
	Sample I			Sample II			Sample III			
Temp. (o C)	31	23	26	30	23	26	34	24	26	40
PH	8.1	7.8	7.5	7.8	7.3	7	8.1	7.1	7.5	6-9
EC (ds/m)	750	550	300	780	580	350	600	500	300	1000
TDS (mg/L)	2000	1800	1400	1650	1250	800	780	660	450	2000
TH (mg/L)	560	480	440	448	400	360	175	155	140	100
DO (mg/L)	16	18	20	20	22	26	3	5	6.5	5
Na^+ (meq/L)	8.3	7.4	6.8	9.4	8.1	7.3	5.3	5	4.6	-
K^+ (meq/L)	0.8	0.7	0.5	0.697	0.6	0.5	0.35	0.3	0.3	-
$SO4^{--}$(mg/L)	47.2	30.2	35	40	22	26	28.2	19	25.2	250
$PO4^{--}$(mg/L)	1.81	0.7	2.9	1.7	0.62	2	0.12	0.1	0.15	5