International Journal of Recent Trends in Science And Technology, P-ISSN 2277-2812 E-ISSN 2249-8109
Special Issue, ICRAFHN 2018 pp 79-82

Special Research Article

# Analytical study of physico-chemical parameter of sugar factory effluents of Yelegaon, District Nanded

S. N. Kabadi[1*], S. S. Kadam[2]

[1]Department of Chemistry, [2]Department of Botany, A.C. S. College, Shankarnagar, Maharashtra, INDIA.
**Email:** sambhaji456@gmail.com, kadamsunil2371@gmail.com

**Abstract**

Water is the most important and fundamental constituent among the elementary substances. Water is a compound of Hydrogen and oxygen gases. It sustains life plants and animals at the earth. Water is an important for human consumption as well as irrigation, agriculture and industrial uses. Water is the most important natural resources in the world without it life can't exist and industries cannot operate. Water is the most vital resource for all kind of life on this planet and the water resources are adversely affected both quantitatively and qualitatively by the many kinds of human activities on land, in air or in water. The increasing industrialization, urbanization and development activities and consequent pollution of water have brought a actual water crisis. Therefore the quality of water is an area of immense concern in our environment.

**Key Words:** Sugar factory effluents, physico-chemical parameters of water, Dist. Nanded.

***Address for Correspondence:**
Dr. S. N. Kabadi, Department of Chemistry, A.C. S. College, Shankarnagar, Maharashtra, INDIA.
**Email:** sambhaji456@gmail.com

Access this article online

Quick Response Code:

Website: www.statperson.com

Accessed Date: 10 March 2018

## INTRODUCTION

India is an agricultural country and majority of its population lives in rural area and agriculture is the main occupation. According to an estimate the agriculture production and yield is increasing due to irrigation throughout India. Country to the belief, agricultural sector is a major source of water consumption for production of Banana, sugarcane etc. In Marathwada region Vishnupuri and Yeldari dam are the major sources of water for agriculture. Due to this farmer cultivate sugarcane as a major cash crop. Sugar factory are considerably increasing in Marathwada region particularly in Nanded districts. The sugar factory is playing an important role in the economic development of region, state and country. Industries contribute to the maximum water pollution. The major industrial pollutants are the variety of chemicals, organic and inorganic. Wastes from industries such pulp and paper mills, chemicals and fertilizers plants, dyes and drug industries wastes and sugar industries etc. are sources of mostly complex organic compound. In many cases, the industrial effluents are directly released in to natural water bodies. The result is disastrous and the consequences have an impact on the existing ecosystem. Rapid sugar factory development has been responsible for the numerical decline of microphytes which constitutes an important constituent of aquatic ecosystem. Chemically polluted water damages the growth of crop and also changes the aquatic vegetation due to artificial nutrients and makes it unfit for human consumption. The present study was undertaken to study the impact of sugar factory effluent of Bhaurao Chavan Sahakari Sakhar Karkhana Ltd. Yelegaon Nanded district. The present study includes the analysis of physicochemical characteristics of effluents of the above sugar factory.

## MATERIALS AND METHOD

Four different water samples were collected from different locations Bhaurao Chavan Sahakari Sakhar Karkhana Ltd. Yelegaon randomly and kept in glass

bottles without any air bubbles. The bottles were rinsed before sampling and tightly sealed after collection and labeled in the field. Analysis of water samples was done as per standard process. All the chemicals used of AR grade. Double distilled water was used for the preparation of regent and solutions. The water samples were immediately brought in to Laboratory for the estimation of Physico-chemicals parameters, like water temperature were recorded at the time of sample collection by using Thermometer.[4-6] While other parameters such as pH, Electrical conductivity, Total Suspended Solids, Total Dissolved Solids, Total Solids, Oil and Grease, Chlorides, Calcium, Hardness, Sulphate, Dissolve Oxygen COD, BOD contents. Temperature, pH and TDS measured as per the by silver nitrate titration method using potassium chromate as indicator. [7]

Table 1: Analytical results of physic chemical parameters Sugar Factory Effluents

| Parameters | Site Notation | | | |
|---|---|---|---|---|
| | S1 | S2 | S3 | S4 |
| Temp. | 29.0 | 28.7 | 28.4 | 28.2 |
| PH | 7.2 | 7.5 | 7.8 | 8.0 |
| Electrical conductivity | 6170 | 5360 | 5230 | 4910 |
| TSS | 135 | 120 | 115 | 110 |
| TDS | 1985 | 1760 | 1550 | 1320 |
| TS | 2130 | 2100 | 2070 | 2050 |
| Oil and Grease | 9.2 | 9.0 | 8.8 | 8.6 |
| Hardness | 335 | 230 | 210 | 190 |
| Chloride | 250 | 245 | 230 | 220 |
| Sulphate | 485 | 480 | 455 | 390 |
| DO | 2.0 | 2.2 | 2.4 | 2.5 |
| COD | 268 | 235 | 220 | 200 |
| BOD | 290 | 265 | 250 | 215 |

## RESULT AND DISCUSSION

All the water samples were collected in the month of January -2000. The results of the physicochemical analysis of the Bhaurao Chavan Sahakari Sakhar Karkhana Ltd. Yelegaon water effluent samples S1 to S4 are compared with standard values prescribed by WHO [8] and are presented in Table.

**Temperature:** The range of temperature of the effluent samples was within 29.0 to 28.5 $O^{o}C$ in their sampling sites studied during the operational seasons. Temperature of S1 site was higher as compare to other site. The sampling of S1 site is very close to the point effluent discharged by sugar factory. As increasing distance the temperature decreases due to loss of heat of effluent in the environment.

**PH:** Change in temp. was recorded in S1 site with higher values from other sites. The S1 site is very close to the point of effluent discharge by sugar factory. The decrease in temp. may be attributed to the loss of heat of effluents in the environment with more in the temp. the concentration of other parameter are affected.

**Electrical Conductivity:** The electrical conductivity of the effluent was recorded in the range 4910 – 6170 µmhos/cm in sampling site of sugar factory during the operational seasons. The electrical conductivity value of S1 sampling sites was higher than that of other sampling sites. The recorded values found to decreases with increase in distance, due to dilution of effluent with water.

**Total Suspended Solids:** The Total Suspended Solids of the effluents was recorded in the range 110 – 135 mg/l. in sampling site studied during the operational seasons. The Total suspended Solids were high value in sampling site S1 from other sampling sites. The suspended solids recorded on these sites decreased with increase in distances. Due to biodegradation and dilution or dispersion of the wastes.

**Total Dissolve Solids:** The range of TDS of the effluent was recorded 1320 – 1985 mg/l in sampling sites studied during the operational seasons. The TDS recorded in the sampling sites S1 was high as compared with the other sampling sites. The TDS recorded on these sites were decrease with increase in distance due to dilution of the effluents.

**Total Solids:** The range of Total solids of the effluent was recorded 2050 – 2130 mg/l in sampling sites studied during the operational seasons. The Total solid was recorded high value at S1 sampling sites than the other sites. The S1 site value of TS was high due to site is close to the point of effluent discharged by sugar factory. The discharge effluent comes from number of processing units which use of solid matters. The other sampling sites TS value are decreases with increase in distances.

**Oils and Grease:** The range of oil and grease of the effluent was recorded 8.6 – 9.2 mg/l in sampling sites studied in operational seasons. The S1 sampling site with higher values of oil and grease then other sites, due to it is very close to the point of effluent discharged by sugar factory. The discharged effluent comes from number processing units which required oil and grease for smooth working process. The other sites value is decreases with increase in distances due to dilution of effluent.

**Dissolve Oxygen:** The range of Dissolve Oxygen of the effluent was recorded 2.0 – 2.5 mg/l in sampling sites studied in operational seasons. The S1 sampling site with lower values of dissolve Oxygen then other sites, due to it is very close to the point of effluent discharged by sugar factory. The comparing S1 sampling site with other sampling sites, the dissolve oxygen recorded on these sites were increased with increase in distances.

**Harness:** The range hardness of the effluents was recorded 190 to 335 mg/l. The hardness wes recorded in

S1 site with higher value from other sites. The S1 site is very close to the point of effluents discharged by sugar factory. The hardness was decreases with increasing distances and dilution of effluents.

**Chloride:** The range Chloride of the effluents was recorded 220 to 250 mg/l. The chloride was recorded in S1 site with higher value from other sites. The S1 site is very close to the point of effluents discharged by sugar factory. The decrease in chloride may be due to biodegradation and dispersion or dilution of effluents.

**Sulphate:** The range sulphate of the effluents was recorded 390 to 485 mg/l. The sulphate was recorded in S1 site with higher value from other sites. The S1 site is very close to the point of effluents discharged by sugar factory. The decrease in sulphate may be due to biodegradation and dispersion or dilution of effluents.

**Chemical Oxygen Demand:** The range of Chemical Oxygen Demand of the recorded effluents was 200 to 268. Sampling site S1 with higher values from other sites. The S1 site is very close to the point of effluent discharged by sugar factory. The COD recorded on S2, S3 and S4 sites are decreases with increasing distance due to biodegradation and dilution of the effluent with water.

**Bio-Chemical Oxygen Demand:** The range of Bio-Chemical Oxygen Demand of the recorded effluents was 215 to 290. Sampling site S1 with higher values from other sites. The S1 site is very close to the point of effluent discharged by sugar factory. The COD recorded on S2, S3 and S4 sites are decreases with increasing distance due to biodegradation and dilution of the effluent with water.

**Bio-Chemical Oxygen Demand:** The range BOD of the effluents was recorded 215 to 290 mg/l. The BOD was recorded in S1 site with higher value from other sites. The S1 site is very close to the point of effluents discharged by sugar factory. The decrease in BOD may be due to biodegradation and dispersion or dilution of effluents.

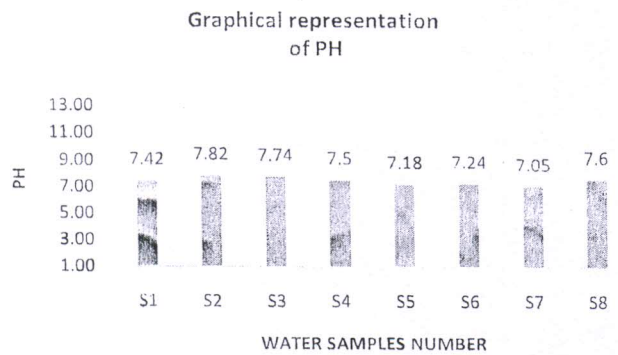
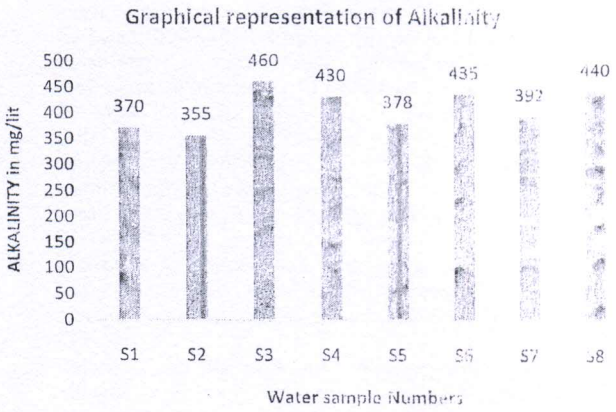



Figure 1:

Figure 2:



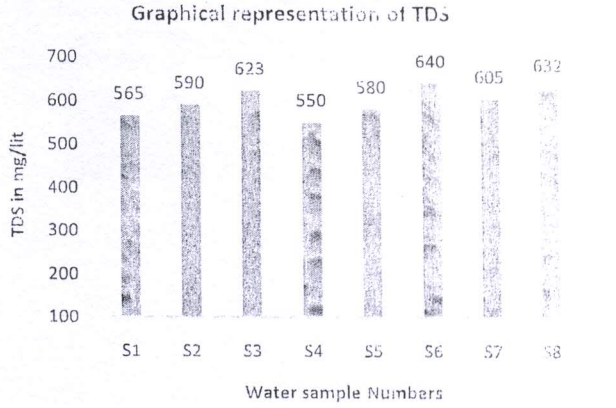




Figure 3:

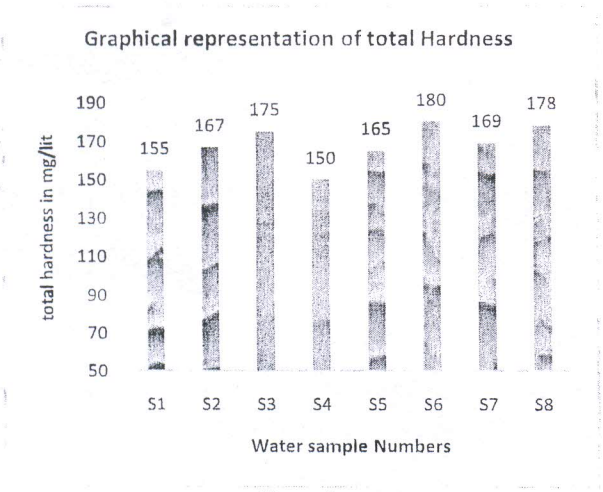



Figure 4:

## CONCLUSION

The analytical results of sugar water effluents of Yelegaon town, Nanded District shows that the PH, total alkalinity, Chloride, calcium, COD are well within the permissible limit given by WHO. The effluent is disperse or diluted by water all parameters are permissible limit. Hence all the samples are fit for agriculture and other purpose.

## REFFRENCES


1. Arawal, R. Agrawal S. K. 1991. Pollution effects of sugar factory effluents on seed germination and seedling growth of cyamopsis hexagolonba(Linn) Taub, Indian Journal of applied and purebiology 6 (1) : 13-16
2. APHA, AWWA, WPCE. 1992. Standered methods for the examination of water and waste water (19th edition). American Public Health association Washington D.C. Arora, H.C. et al 1974. Survey of sugar mill effluents characteristic. Indian journal of environmental Health 16 (3): 233-246.
3. Arindam Kumar, Prasad Kumar. 1998. Physico-Chemical characteristic at Chukia sugar mill effluent. Advances in plant Sciences. 11 (2) 63-68.
4. De, A.K. 1993. Environmental Chemistry. Wiley Eastern limited, New Delhi.
5. Gehalwat, J.K., Singh, C.B. (ed) and Solomon, S. 1995. Welth from effluent of sugar paper alcohol complexes. Sugar cane industrial alternatives. 449-459.
6. Gaikwad, R.W. 1999. Characterization and treatment of waste water in sugar industry proceeding of National conference on Industry and Environment. Karad Dec. 28-30 1999 Ed. R.K. Trivedy. Daya Publishing House, Delhi.
7. Ghugare, r.V. and Magar S.S. 1995 Effect of alcohol distillery effluent (Spent wash) on yield and quality of adsali sugar cane(co-740) in Vertisol. Bharatiya sugar. 22(1): 97-98.
8. Mohamed F. Hamoda and HamedA. Al-Sharekh 1999. Sugar wastewater treatment with aerated fixed-film biological syaytems Water Science and Technology 40:1 313-321.
9. Rajesh, K and Bhargava, A.K. 1998 effect of sugar mill effluent on the vegetative growth and yield of Triticum aestivum CV, Up 2003 Ad Plant Sci. 11: 221-227.
10. Takougang, I. Tchounwou, P.R. and Barbazan, P. 1993. Impact of Sugar mill effluent on the distribution of fresh water molluses in Mband jock: cahiers d' etudes et de researches Erunchophones Sante. 3 (3): 178-182.


Source of Support: None Declared
Conflict of Interest: No Declared