ASIAN JOURNAL
ISSN: 0976-3376

Available Online at http://www.journalajst.com

ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Asian Journal of Science and Technology
Vol. 4, Issue 05, pp.051-054, May, 2013

RESEARCH ARTICLE

STUDY ON EFFICIENCY OF EFFLUENT TREATMENT PLANT OF MOHAN MEAKIN LTD. MOHAN NAGAR AT GHAZIABAD (U.P.) INDIA

***Sadhana Chaurasia, Radhe Shyam and Raj Karan**

Department of Energy and Environment, MGCGV, Chitrakoot, Satna MP.485780

Received 16th February, 2013; Received in Revised from; 18th March, 2013; Accepted 30th April, 2013; Published online 16th May, 2013

ABSTRACT

Water is one of essential requirements of all life supporting activities. It is the master solvent and all metabolic reaction of living beings depends mainly on its presence. It is also essential for agriculture, industries, drinking and many other domestic purposes. One of the most important environmental problems faced by the world is management of waste water. Industrial processes create a variety of wastewater pollutants; which are difficult and costly to treat. Wastewater characteristics and levels of pollutants vary significantly from industry to industry. Now-a-days emphasis is laid on waste minimization and revenue generation. Pollution prevention focuses on preventing the generation of wastes, while waste minimization refers to reducing the volume or toxicity of hazardous wastes by water recycling and reuse, and process modifications and the byproduct recovery as a fall out of manufacturing process creates ample scope for revenue generation. The aqueous distillery effluent stream known as spent wash is a dark brown highly organic effluent and strongest organic industrial effluents, having extremely high COD and BOD values because of the high concentration of organic load, distillery spent wash is a potential source of renewable energy. The paper reviews the status and appropriate treatment alternatives for disposal of the distillery wastewater.

Key words: Effluent, BOD, COD, TDS, Treatment.

INTRODUCTION

Ghaziabad is located at 28.67° N 77.43° E. It has an average elevation of 210 metres (688 feet). It is situated about 1.5 km from the Hindon River. On the north it is bounded by the district of Meerut, on the south by that of Bulandshahar and Gautambudh Nagar, on the south-west by Delhi and on the east by the district Jyotibaphule Nagar. As its boundary is adjacent to Delhi, it acts as the main entrance to Uttar Pradesh and hence is also called the Gateway of Uttar Pradesh. The district of Ghaziabad is suitated in the middle of Ganga-Yamuna doab. In shape it is roughly rectangular, its length is 72 Kms. and its breadth is 37 Kms. Mohan Nagar, a modern industrial township lies in Lat. 28^0 41' North and Long. 77^0 24' East. Mohan Meakin Limited industry was founded in 1958 by N.N. Mohan and is named after him. It has yeast and malt extract plant, a brewery and a distillery, a cold storage, an ice factory and a plant for soft drink. The distillery waste water has very high biological and chemical oxygen demand (Chaubey, 2003). Typical characteristics of the distillery waste water are given in Table 1:

Table 1. Typical Characteristics of distillery wastewater

Parameter	Value
Chemical Oxygen Demand (mg/L)	30000 – 40000
Transmittance (%)	0
pH	8.31 – 8.35
Total Solids (mg/L)	46000 – 61000
Total Dissolved Solids (mg/L)	44000 – 59000
Biological Oxygen Demand (mg/L)	3620 - 4780

Corresponding author: sadhanamgcgv@gmail.com

Today due to industrialization the quality of water is degrading continuously. So it is necessary to determine the quality of wastewater, which is releasing from the industry and also to determine the condition of effluent treatment plant for the treatment to reduce the pollution load from the wastewater (Gurnham 1945). Mohan Meakin Limited is bear manufacturing industry and is discharging its effluent in large quantity in to nearby water body. It may be very harmful to water body as well as for ecology. It may destroy the aquatic ecology. Wastewater monitoring plays an important role identify the limit of elements and chemicals, which a may be injuries to natural aquatic system (Namdeo and Chaurasia 2000).

Objectives

1. To study the wastewater characteristics before and after treatment.
2. To compare the effluent quality with standard.
3. To know the quality for irrigation purpose.

MATERIAL AND METHOD

Monthly analysis was carried out for eight months from Feb. - Sept. 2007 to know the waste water quality before and after treatment. The samples were collected at inlet and outlet point and analyzed as outlined in the standard methods for the examination of water and wastewater. Daily samples were collected in plastic bottles and rinsed with effluent at the sampling site. Inlet samples consisted of waste effluent and outlet consisted of treated effluent. Parameters analyzed were

Table 2.Result of raw wastewater treatment

S.N.	Parameter	Before Treatment								
		February	March	April	May	June	July	August	September	October
1.	Temp ^{0}C	22	22.5	22	21.5	20.5	21	21	22	23
2.	pH	4.2	4.6	5.3	4	3.8	4.7	5.5	3.8	4
3.	BOD (mg/l)	8040	7260	4460	6500	4470	4880	4600	5600	8320
4.	COD (mg/l)	13260	16400	15200	20000	21600	20200	17400	14400	14800
5.	TDS (mg/l)	10080	10080	8480	9540	10200	12040	10030	8536	8740
6.	TSS (mg/l)	8040	8036	7500	7546	6540	6705	6130	8120	8300

Table 3.Result after wastewater treatment

S.N.	Parameter	After Treatment								
		February	March	April	May	June	July	August	September	October
1.	Temp ^{0}C	22	23	22	21	21	22	21.5	22.5	23
2.	pH	7.2	7.6	7.3	7.3	7.4	7.9	7.3	7.2	7.5
3.	BOD (mg/l)	64 (99.20)	60 (99.17)	75 (98.32)	40 (99.36)	48 (98.93)	38 (99.22)	50 (98.91)	70 (98.75)	80 (99.04)
4.	COD (mg/l)	180 (98.64)	148 (99.10)	156 (98.97)	140 (99.30)	184 (99.15)	162 (99.01)	172 (98.71)	186 (98.73)	180 (98.88)
5.	TDS (mg/l)	420 (95.83)	380 (96.23)	388 (95.43)	540 (94.34)	390 (96.18)	380 (96.84)	388 (96.13)	560 (93.44)	350 (95.99)
6.	TSS (mg/l)	140 (98.26)	90 (98.88)	80 (98.93)	120 (98.40)	70 (98.93)	90 (98.66)	70 (98.86)	80 (99.02)	140 (98.31)

- % Decrease values given in parenthesis

Table 4. Standard limit to discharge waste water

S.N.	Parameter	Permissible Limit to be Discharged for irrigation	Permissible Limit to be Discharged in to Public sewers	Permissible Limit to be Discharged in to Water source
1.	Temp ^{0}C	40	45	40
2.	pH	5.5-9	5.5-9	5.5-9
3.	BOD (mg/l)	100	350	30
4.	COD (mg/l)	250	600	250
5.	TDS (mg/l)	200	600	100
6.	TSS (mg/l)	2100	2100	2100

temperature, pH, COD, BOD, TSS, TDS (APHA AWWA WPCF 1992).

RESULT AND DISCUSSION

Table 2 and 3 are showing characteristics of waste water before and after treatment of effluent. These results are discussed below:

Temperature: - The temperature of waste water 21^{0}C to 24 ^{0}C as it depends on atmospheric temperature.

pH: - The pH of Mohan Meakin industry wastewater was found in the range of 3.8 to 5.4 but after treatment it become in permissible range (7.2-7.9).

Biochemical Oxygen Demand (BOD)

The BOD of wastewater observed very high (4460-8320) mg/l but after treatment BOD decreases significantly in the range of 40-80mg/l but these value are also in the higher range in comparison to permissible limit 30 mg/l (For discharge on water sources) these values indicate that though ETP is removing 99% BOD but still effluent is not safe to discharge in water body.

Chemical Oxygen Demand (COD)

The COD of waste water was observed 1360-2160 mg/l but after treatment it comes in the range of 140-186 mg/l indicating approximately 99% COD removal. In term of COD effluent is safe to discharge in surface water body.

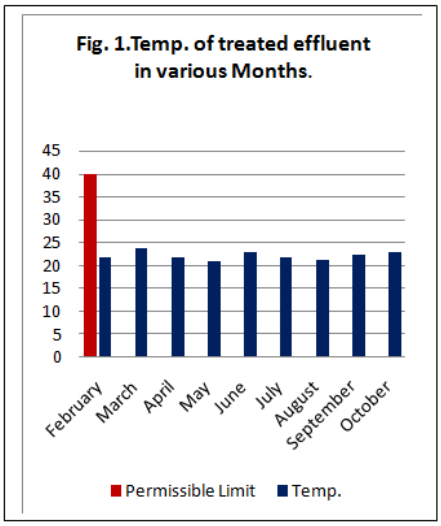
Total Dissolved Solid (TDS)

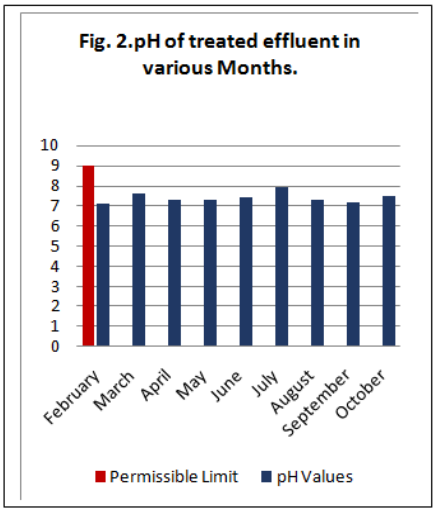
After treatment TDS was found in the range of 350-560 mg/l. Showing 97% removal but still the effluent is not safe to discharge in surface water body as the standard is 100 mg/l.

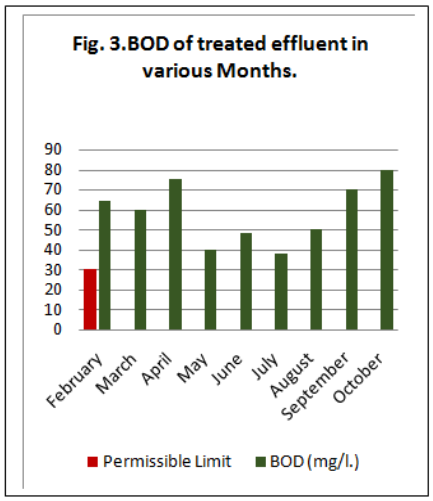
Total Suspended Solid (TSS)

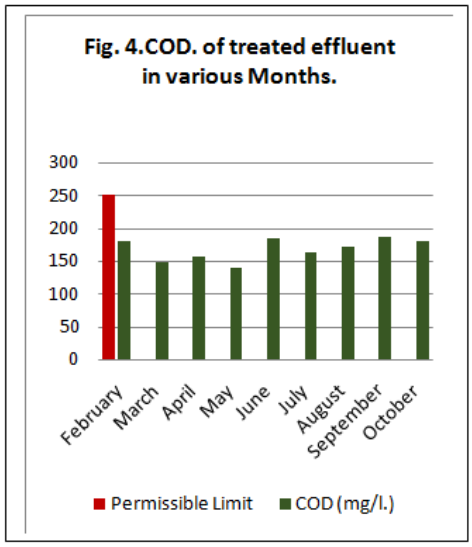
The TSS values in the waste water was observed very-very high but after treatment it comes down in the range of 70-140mg/l. These value are well within the permissible limit of 2100mg/l.

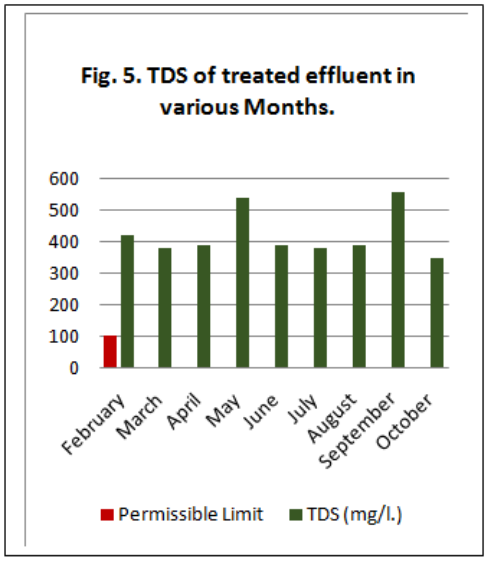
After proper treatment through ETP it shows considerable resection in BOD, COD, TDS, TSS and pH. The result show that the BOD and TDS are above the standard limit for discharge on surface water body. But in term of pH, BOD and TSS treated effluent was in the safe range. Result suggests that Mohan Meakin Limited should work to reduce the BOD and TDS values within the standard.

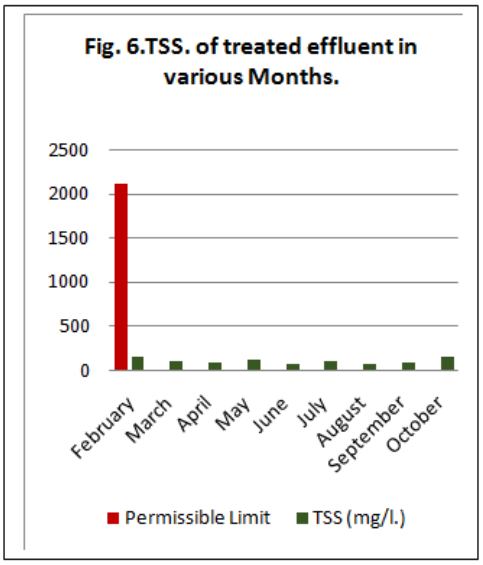


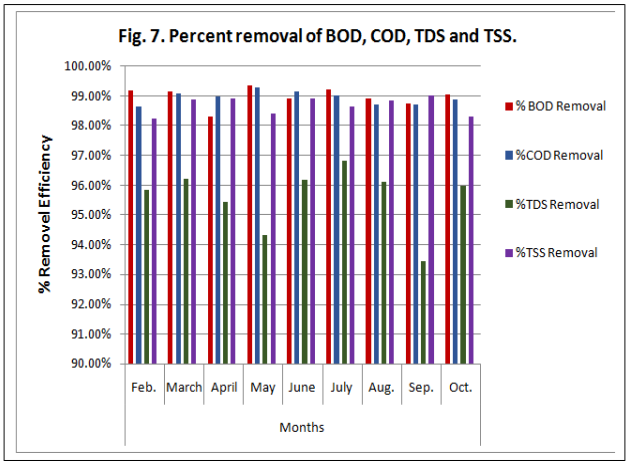












Conclusion and Recommendation

The study indicates that there is efficiency reduction in all parameter from ETP process in Mohan Meakin Ltd. Ghaziabad. The BOD decreases up to 99 %, the COD decreases up to 98%, TDS decreases up to 95.34% and TSS decreases up to 98.42%. It means that the removal of BOD, COD, TDS, and TSS is more than 95% and the removal of BOD is almost 99% but still BOD and TDS were in the higher range then the permissible limit. pH was found in permissible range. The study suggests the company has to make an effort to reduce BOD and TDS in permissible range. This treated wastewater can be used for irrigation and gardening purpose in company interest.

Recommendation

- Daily monitoring of influent and effluent discharge is recommended.
- Daily effluents discharge should be monitored continuously for pH, BOD, COD, TDS, TSS and other significant parameters.
- Treated waste water can be used for irrigation or gardening.
- Organic sludge from the treatment plant should be used as manure for green belt development in company area.

REFERENCE

Agrawal, G.D., Kannan, G.K., Degradation of River due to Diffuse Activities and Appropriate Approach for Management-A Case Study of River Mandakini, J. Indian Assoc. Environ. Manag., ***23,*** 113-121 (1994).

APHA, standard methods for the examination of water and waste water 18 edn, (1995); Arnold E. Greenberg, Lenores. Clessceri and Addrew D. Eaton, American Public Health Association, Washington.

Banerjee, S and Singh, S.K. and Maiti, S.K. (2001) "Effluent generation and its treatment during steel making an overview". IJEP 21 (21): 1105-1117.

Chaubey, M (2003) "Study of waste water treatment of dairy industry IJEP 23 (4): 361 –363.

Data, M.T and Kale, S.B (1997) "Performance of a dairy effluent treatment plant" IJE HEALTH 39 (1); 52-60.

Gurnham C. (1945) Fred principles of industrial waste treatment, John Wiley and Sons INC. Newyork.

Nageswara Sahrma, P. and Sita, K and Rao, Rama and Lakshmi, V.V.S and Bhuvaneshwari, Y and Hussain, Sajid and Sarvanti (2000) "Effluent treatment of nitro phenol manufacturing industry IJEP 20(7): 533-538.

Namdeo B. and Chaurasia S. (2000) Effectivity of effluent of treatment plant and impact of treated effluent on flora and fauna." IJEP 21 (1): 29-32.

Parmar P and Chaurasia S. (2001) "Efficiency study of GAIL effluent treatment plant" IJEP 21 (7): 638-641.

****