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Impacts of Dairy waste disposal on Water Quality of Gaur River near Katiya Ghat, Jabalpur

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Abstract-

Water quality is determined by comparing the physical and chemical characteristics of a water sample with water quality guidelines or standards. When water is termed as polluted water various causes are responsible for polluting water. Some natural causes are mixture of bio-degraded portion of animal and plants to pure water, siltation by erosion of river banks. Gaur river, a main tributary of river Narmada is situated near Barela in the district of Jabalpur. it meets with river Narmada in kharni ghat near Jamatara, are in an adverse condition as per pollution is concern. It is due to growth of industrialization and increase in population in the area especially near the banks of the river. The main cause of pollution in the area is the waste coming from the dairy industries situated at the banks of the river, they directly releases the waste coming from the industry into the river water. Organic pollution affects the organisms living in a stream by lowering the available dissolved oxygen in the water. This causes reduced fitness, or, when severe, asphyxiation. Organic wastes also settle out on the bottom of the stream, altering the characteristics of the substratum and it takes a lot of affords in the treatment of water. The water treatment plants which is situated in the area named Bongadwar Treatment plant is facing problems due to the condition of river water which they are treating and using for public supply. This paper presents an experimental study on the problems of disposal of wastewater on the river Gaur and its effects on the Bongadwar water treatment plant.

Introducton-

A study carried out by Joardan M.A. et al. (2008) revealed that almost in India 70% of surface water resource and ground water reserves have been contaminated by biological, organic and inorganic wastes. The wastewater pollutants are harmful to environment and public health. The biological decomposition of organic compounds could result in killing of fishes and generation of foul odors. There are many pollutants that could exhibit toxic effects on aquatic life and the public health. Water borne diseases are also eliminated through proper wastewater treatment. The wastewater treatment is removal of contaminants from water. The chemical contamination of water sources due to certain industries or from natural source. High turbidity can inhibit the effects of disinfection against micro-organisms and enable bacterial growth Drinking water should be colorless, since drinking water coloration may be due to the presence of colored organic matter. Organic substances cause water odour, and industrial pollution and from microbial pathogens cause health hazards. Pollution is the introduction of a contamination into the environment (Webster,2010). It is created by industrial and commercial waster, agricultural practices, everyday human activities and most notably, models of transportation. Pollution of water is due to increased human population, industrialization, use of fertilizers in agriculture and manmade activity. The water quality refers to the presence components of water

in their optimum level such that it supports the growth of plants and animals. Temperature, turbidity, nutrients, hardness, alkalinity, dissolved oxygen etc. are some of the important factors that play a vital role for the growth of living organisms in the water body. Water quality indicates the relation of all hydrological properties including physical, chemical and biological properties of the water body. Hence water quality assessment involves analysis of physico-chemical, biological and microbiological parameters that reflects the biotic and a biotic status of ecosystem.

The present study aims to find out the impacts of organic waste due to industrialization on the banks of river Gaur and its adverse affects on the efficiency of the Bhongadwar treatment plant which is used to treat the water for the domestic supply water from the river.

Dairy Waste Disposal On River Water

The location is well affected with the liquid organic waste coming from the industries (dairy Industry) situated in the banks of the river which tends to pollute the water and affect the surrounding living atmosphere due to present contamination in the river water. Wastes when disposed of in water, bacteria and other micro-organisms combine with oxygen dissolved in water to break them down, can be termed as "oxygen demanding" wastes. Liquid organic wastes include sewage, many wastes from industries (especially industries producing agricultural and tannery products) and run-off from rains, floods and storms which picks up organic wastes from land, before flowing into streams, rivers, lakes or seas.

Impacts of Water Pollution

A large amount of urea is used for cultivation. Only 40% of dissolved urea is absorbed by plants. Remaining is mixed with water. If caused quick growth of unexpected plants. For biodegrading of these plants oxygen is taken from water. As a result amount of dissolved oxygen (DO) is depleted. Industrial wastes also caused depletion of DO by occurring chemical reaction. There is no normal P_H that applies to all fishes. Because fish originate in ponds, rivers, lakes, oceans that have different pH levels. But sudden change of pH can be harmful or even fatal to fishes. In the dry season the DO level becomes very low and the river becomes very toxic.

The people who are living by the river which is polluted by various germs and micro-organisms are severely suffering from various diseases like cholera, diarrhea, dysentery etc, often. Silt may cover the leaves of aquatic plants and increase the turbidity of water, as a result, sunlight cannot reach to the leaves of the plants and photosynthesis reaction is hampered. So, plants cannot produce oxygen and food for them. Consequently, ecosystem is hampered.

Water treatment plant is also facing problems regarding in their operational efficiency as the performance of the filters, sedimentation unit is reduced due the increase in the pollution in water. Extra efforts are to be taken for the treatment of water.

Materials and Methods:

Study Area:

Gaur river, a main tributary of river Narmada is situated near Barela in the district of Jabalpur. The river merges into the river Narmada at Village Jamtara are in an adverse condition as per pollution is concern. Here, a dairy hub has been developed and thousands of cattle and buffalos are being maintained in these dairies in the aforesaid area.

Field Visit and Water Sampling:

The field visit has been done at different location of river Gaur in May 2016 and the selected sampling locations are at Katiya Ghat, Katiya ghat pump house, Kosam ghat, Gaur (near bridge) these locations are situated near to katiya ghat pump house which is situated 3 km from the Bongadwar treatment plant.

Samples have been taken from these locations as per the guidelines. samples has been taken from places near the banks of river like untreated surface water of river near the Bridge of Gaur River locally called (*Gaur nadi ka pull*), banks like Kosham Ghat, Katiya ghat, katiya ghat pump house. Samples have been

taken near the banks of river at different locations. Water samples are carried of 1 litre capacity with stopper were used for collecting samples. Each bottle was washed with 2% Nitric acid and then rinsed three times with distilled water. The bottles were then preserved in a dark and clean place. The bottles were filled leaving no air space, and then the bottle was sealed to prevent any leakage. Each container was clearly marked with the name and date of sampling.

Water Quality Testing and Analysis

The water samples were tested and analyzed for various parameters in the laboratory of Lalpur, water treatment plant Jabalpur. Various physical and chemical parameters like Temperature, Colour, pH, Turbidity, Total Dissolved Solids (TDS), Hardness, Dissolved Oxygen (DO), Chloride, Iron, Fluoride and Alkalinity have been monitored for the water samples. The values of various water quality parameters have been shown in Table 1.

Table: 1 Water quality at different location of the river

Parameters	Katiya ghat	Kosam ghat	Katiyaghat(PH)	Gaur near Brigde
Turbidity(NTU)	7	23	9	36
TDS(mg/l)	220	210	230	280
colour	clear	Pale yellow	clear	Pale yellow
Temperature	31.2	31.3	33.1	33.2
Iron(mg/L)	0.5	0.3	0.5	0.5
pH	8	7.5	7.5	8
Fluoride(mg/L)	0.3	0.4	0.2	0.4
Alkalinity(mg/L)	75	78	80	82
Chloride(mg/l)	19.4	18.6	19.5	20.5
Total hardness	160	164	140	160
DO	6.4	7.1	7.5	7.2
BOD(mg/L)	7	6	8	9
COD(mg/L)	11.3	12.5	11.9	13.5

Result and discussion:

It can be seen in the above table the water quality analysis which is conducted in different locations across the river in various physical, chemical, biological parameters shows the quality of water is not considerable for direct drinking purpose. At different locations water quality are effected by surroundings such as stagnant of water disposal near banks of the river which encourages the development of various water borne generating diseases. In the above analysis water sample shows colour in the locations like (kosam ghat and Gaur river near bridge) the surroundings of the these locations are polluted and congested household waste are commonly and openly connected to these locations production of algae is common in these two locations the value of BOD, COD are also high comparatively to others locations. The other two locations which are taken into account are katiya ghat and katiya ghat pump house these two location are not shown the any color or odour in the water sample but the values of arsenic, fluoride and BOD,COD are high these problems arises due to development of industries near the bank of river especially the area known as the dairy hub of city around 27 dairies are situated across the bank of the river which disposes untreated waste water in the river which encourages various infection prone diseases to develop in surface water. Water treatment plant with is situated for public water supply are also facing the problems with is occurs due to the water quality the working efficiency of the plant is effected as well as usage of disinfection is also increased. To reduces the impact of waste in the water quality steps should be taken account like decomposition of

domestic waste should be done near the bank, water of households should be disposed in water, the industries near bank should be treat the waste water before the disposal in the river or near bank of river, location of the industries should be transferred to maintain the water quality, for treatment plant a pre treatment and sustainable solution should be used which helps in increasing the efficiency and reduces the usage of disinfection in supply water.

Conclusion-

Rivers are highly polluted by due to the dairy waste disposal around the area which tends to change the water quality into adverse condition.

It affects the efficiency of Bongadhwar treatment plant both economically and environmentally. That affects the efficiency and cost of treatment plant situated in the area to supply the water. The dairy industries should be done treatment of waste water as per the guidelines before releasing it in the river to avoid the adverse condition of water.

References

1. Jabaplur Municipal co-operation (JMC) 2011
2. Joseph P.V.and Claramma J., Physicochemical characteristics of Pennar River, a fresh water wetland in Kerala, India, *J. Chem*, 7(4),1266-1273 (2010)
3. Mahananda M. R., Mohanty B. P., Behera N. R., Physico-chemical analysis of surface and ground water of Bargarh
4. MushiniVenkataSubba Rao, VaddiDhilleswara Rao and Bethapudi Samuel AnandAndrews , Assessment of Quality of Drinking Water at Srikurmam in Srikakulam District, Andhra Pradesh, *India, I. Res. J. Environ. Sci.*,1(2) 13-20
5. Venkatesharaju K., Ravikumar P., SomashekarR.K.,Prakash K.L, Physico- chemical and Bacteriologi
6. Water Demand management and strategy and implementation plan for Jabalpur city www.Webester.com 2010
7. Wang Y. C., Peng Y. A., Li Y. M., The characteristics of water pollution and engineering-oriented prevention on Dianchi. *Areal Research and Development*23, 88–92 (2004).
8. Zhang L. Y., Zhang L., Liu Y. D., Shen Y. W., Liu H., Xiong Y., Effect of limited artificial aeration on constructed wetland treatment of domestic wastewater. *Desalination*250(3), 915-920 (2010)