



International Journal of ChemTech Research CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555 Vol.10 No.8, pp 645-655, 2017

Experimental Investigation on Quality Assessment and Pollution Control of Kanampalayam Lake

Veena B.*, JalagandeswaranV., Surya T.Anish.S, Manikandan.V

Department of Civil Engineering, Dr. N.G.P Institute of Technology, Coimbatore, Tamilnadu, India.

Abstract : Waste water treatment is the process of removing existing contaminants from water and to dispose the contaminated water safely or reuse the treated water. The waste water generally contains 99.9% water and 0.1% of solid impurities; thus, it has a large potential as a source of water for different purposes such as fish ponds, comfort rooms, cleaning source, among others. Treated water can be used further in the natural environment without adverse ecological impact. This paper describes about an experimental investigation conducted to study the behaviour and parameters of lake water sample of Kannampalayamlake using Nualgi treatment process. Usage of Nualgi liquid for treating the lake water sample will generate plankton which cultivates food in aquaculture products to boost the growth of prawns and fishes, the product promises to be eco-friendly by preventing mass kill of fish and on doing so we can save from global warming to a certain extent. Nualgi is used to grow diatom algae which absorb CO_2 and nutrients by photosynthesis and release Oxygen at the micro plant level. The oxygen released helps aerobic bacteria to breakdown organics in the water into base constituents. The growing diatoms not only produce oxygen but also consume nutrients like nitrates and phosphates, thus removing it from the water body. The basic test was carried out in laboratory for water sample collected from various source point. These test results of combined sample for before treatment and after treatment are compared with standard values for irrigation water. These test result shows that dissolved oxygen in water increase and reduce BOD, COD, Odour and Colour.

Keywords : Nualgi, plankton, diatom algae, photosynthesis process, dissolved oxygen, etc.

1.0 Introduction

Waste water treatment is the process of removing existing contaminants from water and to dispose the contaminated water safely or reuse the treated water. This study deals with the Kanampalayam Lake which is situated near Sulur. It has been polluted by a mixture of municipal solid wastes and the sewage water. The water is so polluted that it cannot be used for any other purposes. The surrounding agricultural land areas are dependent on this water. Our project is to assess the quality of water and to find the treatment methods for the purification and preventing the water from further pollution. By doing this, the water can be used for carrying out agriculture, fish farming can be promoted and people can use this water for domestic purpose. A model of wastewater was constituted in the laboratory to attempt the approach of efficient removal of pollutants from the foresaid lake wastewater. This paper reports on the study done using Nualgi process for the treatment of lake wastewaters.

1.1 Nualgi Liquid:

Usage of Nualgi liquid for in waste water or in any water will generate plankton which cultivates food in aquaculture products to boost the growth of prawns and fishes, the product promises to be eco-friendly by preventing mass kill of fish and on doing so we can save from global warming to a certain extent. Nualgi is used to grow diatom algae which absorb CO_2 and nutrients by photosynthesis and release Oxygen at the micro plant level. The oxygen released helps aerobic bacteria to breakdown organics in the water into base constituents. The growing diatoms not only produce oxygen but also consume nutrients like nitrates and phosphates, thus removing it from the water body.

2.0 Objective of This Study

The ultimate aim of this work is to ascertain the performance of waste water by adding Nualgi. Then the parameter of treated water is compared with the standard values.

2.1 Literature Review

Michelle Monroe on **December 5, 2008**[1] made a study on the Nualgi Powder and brought out its significant features. Its effect on sewage water effluent and Upon application to the water body in the presence of macronutrients like N, P, K and sunlight, phytoplankton predominantly in the form of **DIATOMS**, bloom and is soon converted to live food like zooplankton which is attractive to fishes and prawns.

JyothiKiran [2], Tuesday, January 27, 2009 described Nualgiis an eco-friendly way to treat sewage water.

3.0 Experimental Setup

Our experiments were done in laboratory by considering a fish tank of size 0.5m x 0.25m x 0.23 m. It was filled with lake water sample of about 15-18 litres. (Mixture of sample from various source points)



Figure 1: Fish tank setup with polluted lake water sample

Figure 1 shows that the treatment setup tank with lake water sample with odourness and more amount of impurities.

4.0 Material

4.1 Nualgi

It is used for treatment of polluted lake or river, which is available in both powder and liquid form which needs to be dissolved in a container before draining into water body.



Figure 2: Nualgi in liquid form



Figure 3: Fish tank setup with lake water sample after treatment

Figure 3 show the after treatment polluted lake water by growing of diatom algae which absorb CO_2 and nutrients by photosynthesis and release Oxygen at the micro plant level. The growing diatoms not only produce oxygen but also consume nutrients like nitrates and phosphates, thus removing it from the water body.

5.0 Results and Discussion

5.1 pH:

pH or hydrogen ion concentration is an important quality parameter of natural and waste waters. Though it has no direct effect on the human health, all bio chemical reaction is sensitive to the variation of pH. The pH value for Kanampalayam Lake samples are 8.10, 7.75, 7.8, 7.94 and for combined sample is 8.09

5.2 TDS:

The TDS mentions the total dissolved solids in the lake waters which make it unsuitable for utilization for various purposes. The TDS values are 1000mg/l, 1005mg/l, 1010mg/l, 1596mg/l and for combined sample is 1010mg/l. have been reduced to a greater extent from the mentioned treatment methods.

5.3 Chlorides:

The permissible limit of chloride content in water should be 250 mg/l for drinking purpose and 600-900 mg/l for irrigation purpose. Though the raw sample possess chloride content within irrigation standards the other constituents in the water are not within the limits hence these waters cannot be used for irrigation purpose as well. The chloride content for collected sample are 674.73mg/l, 599.76mg/l, 574.77mg/l, 624.75mg/l and for combined sample is 287.4mg/l [4].

5.4 BOD:

Biological Oxygen Demand (BOD) is defined as the amount of oxygen required by bacteria while stabilizing decomposable organic matter under aerobic condition. In the present study BOD values for sample are 450 mg/l, 320mg/l, 240mg/l, 60mg/l and for combined sample is 210 mg/l.

5.5 COD:

The Chemical Oxygen Demand (COD) is defined as the amount of oxygen required by the chemical oxidizing agent to oxidize or decompose the organic matter and non-degradable organic matter present in the

sample. The COD values for sample are 1360mg/l, 700mg/l, 800mg/l, 500mg/l and for combined sample is 616mg/l.

5.6 Dissolved Oxygen:

The Oxygen dissolved in water had varying concentrations. This determines whether water is suitable for drinking or any other purpose or is it unsuitable for any purpose [5]. Generally when DO content is above 6 mg/l the water becomes consumable. Hence the treatment methods involved to increase the Dissolved Oxygen content.

5.7 Nitrate:

The nitrogen content is the main cause forprocess of Eutrophication to occur and hence this nutrient content has to be reduced to a greater extent [6]. The treatment methods gave satisfactory report and suggest to be adopted on the future to treat all other polluted lakes.

5.8 Phosphate:

The phosphorous content is another serious nutrient for the Eutrophication process to take place. The phosphate value for combined sample is 2.35mg/l.

5.9 Sulphates:

Though the sulphate content is within irrigation standards it cannot be used for drinking purpose [8]. The sulphate value for combined sample is 290 mg/l.

Table 1: Test results of Lake water sample

Parameters	Standard	Sample 1	Sample 2	Sample 3	Sample 4	Combined
	value					sample
pH	5.5-9.0	8.10	7.75	7.8	7.94	8.09
Turbidity[NTU]	5	5.1	5.2	5.7	8.0	4
TDS [mg/l]	2100	1000	1005	1010	1596	1010
TSS [mg/l]	200	34	495	240	198	490
COD [mg/l]	500	1360	700	800	500	616
BOD5	100	450	320	240	60	210
[mg/l]						
Chloride [mg/l]	600-900	674.73	599.76	574.77	624.75	287.4
DO	<5	2.8	3.9	3.6	4.7	4.5

Combined sample is taken for treatment process by using Nualgi liquid.



Figure 4. Variation of COD content in collected waste water sample



Figure 5. Variation of TSS content in collected waste water sample



Figure 6. Variation of pH in collected waste water sample



Figure 7. Variation of TDS content in collected waste water sample



Figure 8. Variation of BOD content in collected waste water sample



Figure 9. Variation of chloride content in collected waste water sample



Figure 10. Variation of Turbidity in collected waste water sample



Figure 11. Variation of DO in collected waste water sample

Parameters	Standard values	Before treatment	After treatment
pH	5.5-9.0	8.09	7.71
Turbidity[NTU]	5	4	2
Hardness [mg/l]	120	180.35	68.73
BOD[mg/l]	100	210	60
COD[mg/l]	500	616	350
Nitrate[mg/l]	10	7.93	4.5
Phosphate[mg/l]	0.1	2.35	0.9
Chloride[mg/l]	600-900	287.4	167.43
TDS[mg/l]	2100	1010	870
TSS[mg/l]	200	490	68
Sulphate[mg/l]	1000	290	191



Figure 12. Variation of pH values



Figure 13. Variation in Turbidity



Figure 14. Variation in COD content



Figure 15. Variation in Hardness



Figure 16. Variation in BOD content



Figure 17. Variation in Nitrate content



Figure 18. Variation in Phosphate content



Figure 19. Variation in Chloride content



Figure 20. Variation in TDS



Figure 21. Variation in TSS



Figure 22. Variation in Sulphate content

The test result shows that waste water after treated with Nualgi will reduce the content of BOD, COD, TDS, TSS with increase in dissolved oxygen.

6.0 Conclusion

It becomes an essential fact that treatment of waste water plays a vital role in day to day life to meet the needs of utilizing water for both domestic and irrigation purposes. To overcome this an effective method was adopted to treat the waste water. Nualgi liquid was used as a treatment ingredient which cultured food for aquatic life and dissolved the impurities as well. The test results were compared before treatment and after treatment of water and was concluded that using Nualgi liquid for treatment not only reduced to pollution in water but also improved the quality of water.

7.0 References

- 1. Albert Mann, "The dependence of the fishes on the Diatoms", Ecology Vol, No.2 (Apr., 1921), pg.79-83
- 2. A. Birol, "Estimating the values of improved wastewater treatment: The case of River Ganga, India," International Food Policy ResearchInstitute, USA, 2009.
- 3. WHO, Guidelines for Drinking-water Quality-Volume 1:Recommendations, 3rd ed. ISBN 9241546964, 2006.
- 4. Kimwaga R.J. Optimisation of the Waste Stabilisation Pond Effluents Treatment by use of a Coupled Dynamic Roughing Filters and HSSFCWs. Ph.D. Thesis, University of Dar es Salaam 2004, pg. 5-100.
- 5. William J Oswald, Photosynthesis in sewage treatment "1995, Paper No. 2849
- 6. William Oswald,"The coming industry of controlled photosynthesis",1962
- 7. Albert Mann, "The Economic importance of Diatoms"
- 8. Dr. Armburst, "The life of the Diatoms in the World's oceans"
