

FEASIBILITY OF USE OF DUCKWEED FOR TREATMENT OF SLUDGE WATER

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Abstract - This paper deals with the experimental study based on the use of 'Duckweed' in pond water. The experiments were performed on the pond water for about 2 months with a total 5 number of samples taken after 15 days interval. Various important parameters such as DO (dissolved oxygen), Nitrate, Ammonia, Phosphate, Turbidity, pH, Total Suspended Solids, COD (Chemical oxygen demand), BOD (Biochemical oxygen demand) were analysed. These results were very much useful in understanding the removal efficiency of pollutants from the water sample by Duckweed.

Key Words: Ammonia, BOD, COD, DO, Duckweed, Nitrate, Phosphate, Pond water.

1. INTRODUCTION

Ponds and lakes are used as water reservoir to store water and further use it for the daily needs such as for irrigation and domestic purposes. At present these ponds and lakes are being considered as a waste dumping site by the people living nearby and no maintenance work is being done to improve the quality of the water present in it. It is a true fact the water is depleting at a faster rate and we will be running short of it very soon. The recharge produced by these ponds and lakes will no longer be acceptable by the human body if left untreated. We will have to preserve it and utilise it sustainably. Most of the lakes and ponds are polluted by the human intervention and lack of public awareness. As a result of these human activities the lakes and ponds have become a source of unhealthy environment. The cases of water borne diseases such as Malaria, Dengue and other diseases have increased in the past few years. Studies have shown that the increasing number of diseases are a result of the degraded quality of water of these ponds and lakes since these are continuously polluted by the waste dumped and the pollution caused by the human activities. Since the water in ponds and lakes is very less as compared to river bodies, treatment of the same is possible. An experimental study has been done in the current research to improve the quality of water in lakes and ponds by introducing Duckweed.

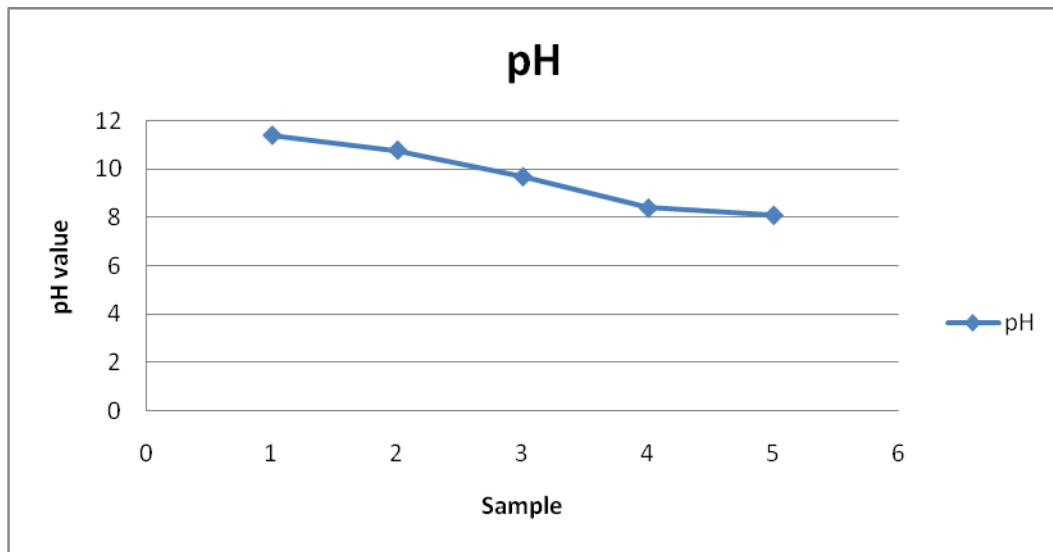
2. MATERIALS AND METHODOLOGY

In this study, experiments were performed on the pond water for about 2 months with a total 5 number of samples taken after 15 days interval. Various important parameters such as DO (dissolved oxygen), Nitrate, Ammonia, Phosphate, Turbidity, pH, total suspended solids, COD (Chemical oxygen demand), BOD (Biochemical oxygen demand) were analysed. These results were very much useful in understanding the removal efficiency of pollutants from the water sample by Duckweed.

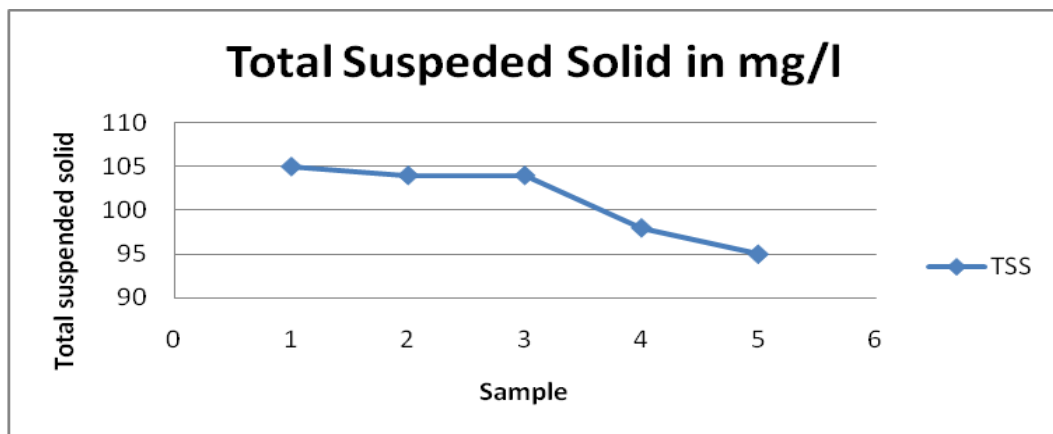
The pond water was stored in a specially designed tank to store 50 litres of water. The initial testing of the water was done on the first day and then 250 grams of duckweed was poured into the tank. The duckweed was allowed to grow and the change in various parameters such as DO (dissolved oxygen), Nitrate, Ammonia, Phosphate, Turbidity, pH, total suspended solids, COD (Chemical oxygen demand), BOD (Biochemical oxygen demand) were analysed.

3. RESULT AND DISCUSSIONS

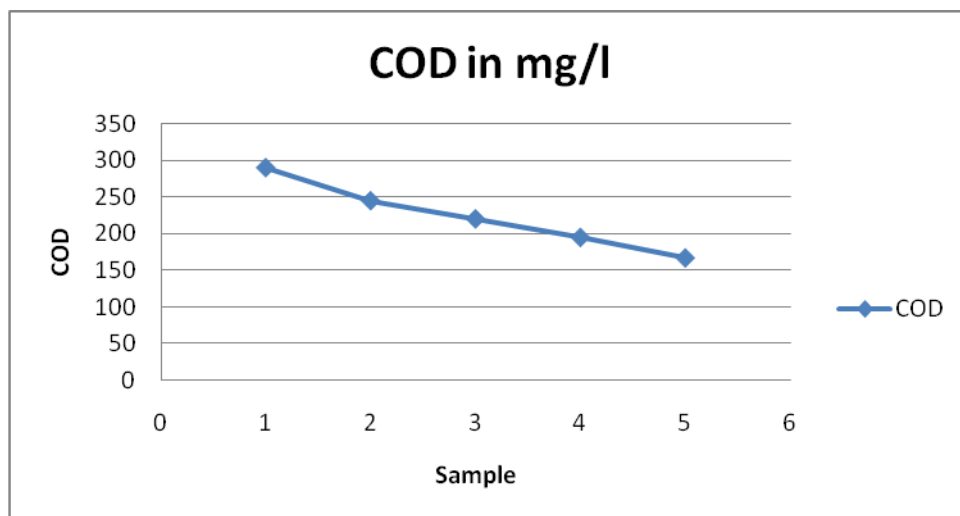
- i. pH for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous decrease for a period of 2 months.



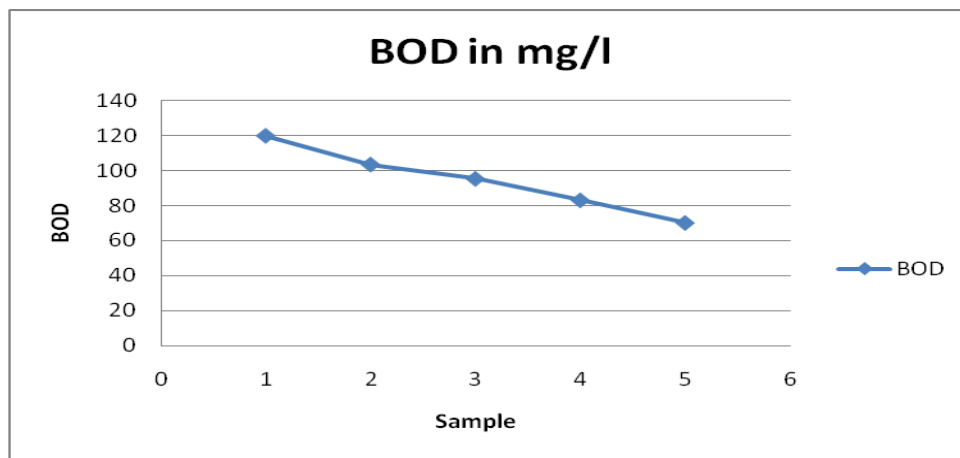
- ii. Total suspended solids for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous decrease for a period of 2 months.



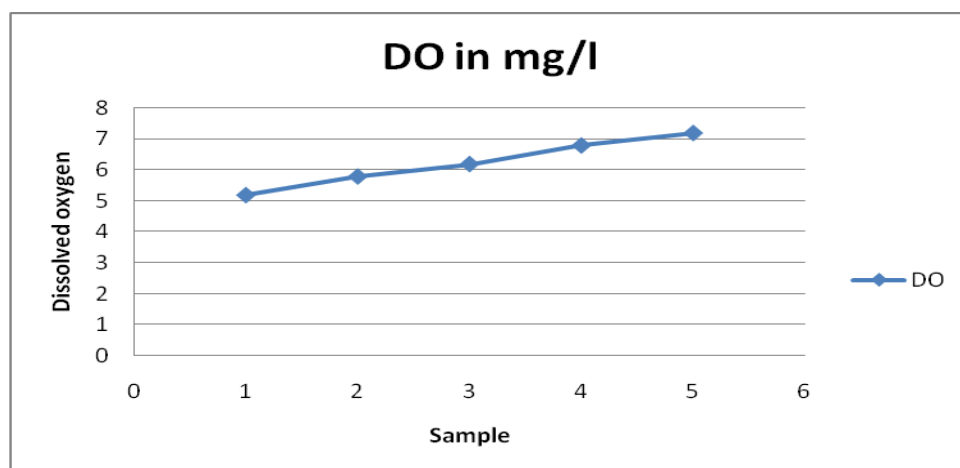
- iii. Chemical oxygen demand for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous decrease for a period of 2 months.



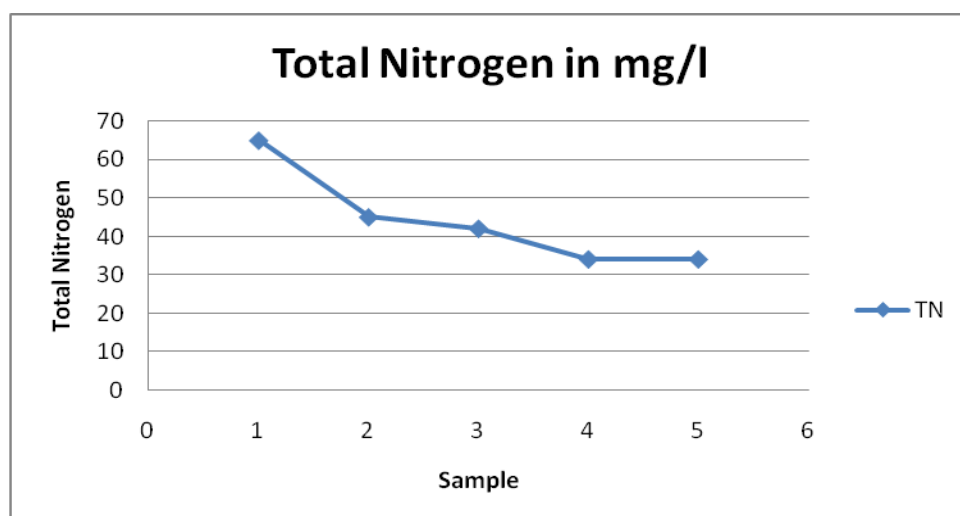
- iv. Biochemical oxygen demand for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous decrease for a period of 2 months.



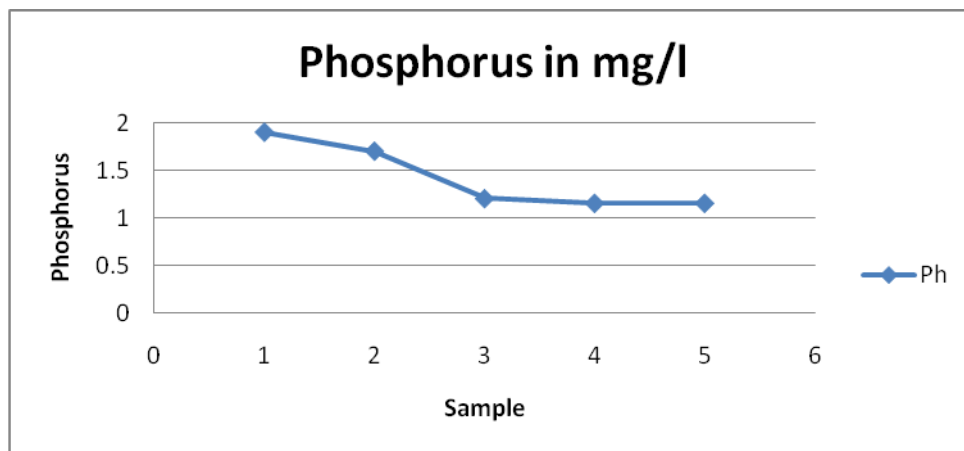
- v. Dissolved oxygen for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous increase for a period of 2 months.



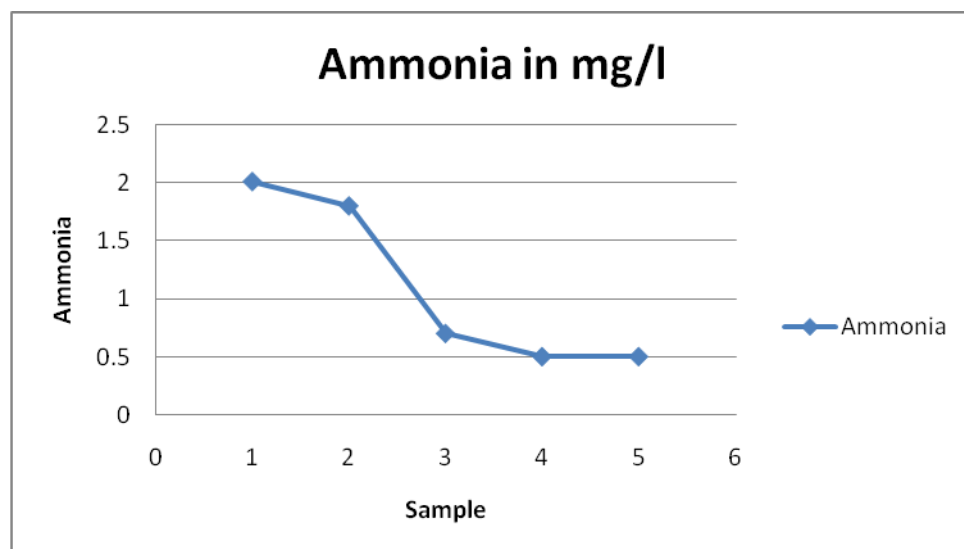
- vi. Total nitrogen for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous decrease for a period of 2 months.



- vii. Phosphorus for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous decrease for a period of 2 months



- viii. Ammonia for the samples collected for the contaminated pond water and after the addition of duckweed shows a continuous decrease for a period of 2 months



4. CONCLUSIONS

- The value of pH decreases upto 29% as compared to the contaminated pond water.
- The value for total suspended solid decreases by 9.5% as compared to the contaminated pond water.
- The value for chemical oxygen demand decreases by 42.5% as compared to the contaminated pond water.
- The value for biochemical oxygen demand decreases by 42% as compared to the contaminated pond water.
- The value for dissolved oxygen increases by 38.5% as compared to the contaminated pond water.
- The value for total nitrogen decreases by 47.5% as compared to the contaminated pond water.
- The value for phosphorus decreases by 39.5% as compared to the contaminated pond water.
- The value for ammonia decreases by 75% as compared to the contaminated pond water.
- The above results clearly show that the presence of duckweed improves the water quality of the pond; hence it can be used at a larger scale as it may improve the water quality without much treatment expenses.

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