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Impairments to Lakes of Sanjay Van, New Delhi

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Abstract: The aim of this paper is to study the anthropogenic inputs of nutrients and potential management of eutrophication in Sanjay van lakes. This case study was attempt to demonstrating that nutrient loading restriction is the essential cornerstone of aquatic eutrophication control. In addition, presenting results of a preliminary qualitative analysis of the causes and correlating it to the secondary analysis of the potential stress to biodiversity and finally made an attempt to recommend the possible interventions as per the knowledge and results obtained from the study
Keywords: Algae, Anthropogenic, Eutrophication, Aquatic biodiversity.

I. INTRODUCTION

Algae are a large group of organisms which flourish in fresh water places such as lakes, wetlands. During day, the algae produces an excess of oxygen for other organisms. High levels of agricultural or sewage runoff can cause large quantities of nitrogen, phosphorus and potassium to enter aquatic system (Fried et al., 2003). When added to a water body such as the Sanjay van lake, these nutrients can cause large fluctuations in the environmental conditions. In this case study experiment the effects of Ph, Nitrogen, Light and temperature on the algal growth in the 5 lakes of sanjay van is measured. It was hypothesized that high amount of nitrogen in the presences of Ph, Light and High Temperature will cause the most algal growth on the basis of which stress on the biodiversity of the lake is accessed and possible interventions are recommended. Anthropogenic inputs of nutrients to the Earth's surface and atmosphere have increased greatly during the past two centuries. This nutrient enrichment, or eutrophication, can lead to highly undesirable changes in ecosystem structure and functioning, with this short duration case study an attempt was made to analyze the causes, impacts, and potential management of eutrophication in sanjay van lakes. This case study was attempt to demonstrating that nutrient loading restriction is the essential cornerstone of aquatic eutrophication control. In addition, presenting results of a preliminary qualitative analysis of the causes and correlating it to the secondary analysis of the potential stress to biodiversity and finally made an attempt to rommend the possible interventions as per the knowledge and results obtained from the study.

II. MATERIALS AND METHODS

A. Preliminary Group Visit was made to identify the site, identify the problem and collect the preliminary samples (Randomized sample) from the site
B. Preliminary analysis of the samples was done in the laboratory to determine the water profile and identify the problem associated.
C. Results were discussed and Individual work distribution was done
D. Problem identification
E. Collection of Samples (Randomized Samples)
F. Water Quality Analysis
G. Clean the Test Tubes
H. Fill all the 20 Test Tubes with analyzed samples
I. Cover 10 Test Tubes with Silver Foil (Light Test)
J. 10 samples a left in the room temperature and the other half 10 sample are place in the refrigerator
K. Test tube Samples are Harvested and Weighed Species Identification and Chlorophyll Test is done

L. Collection of Samples:
1) Wash the bucket before using it.
2) Dip the bucket in the water body 3-4 times befoe drawing out the sample water.
3) Wash your hands and the sample bottle properly.

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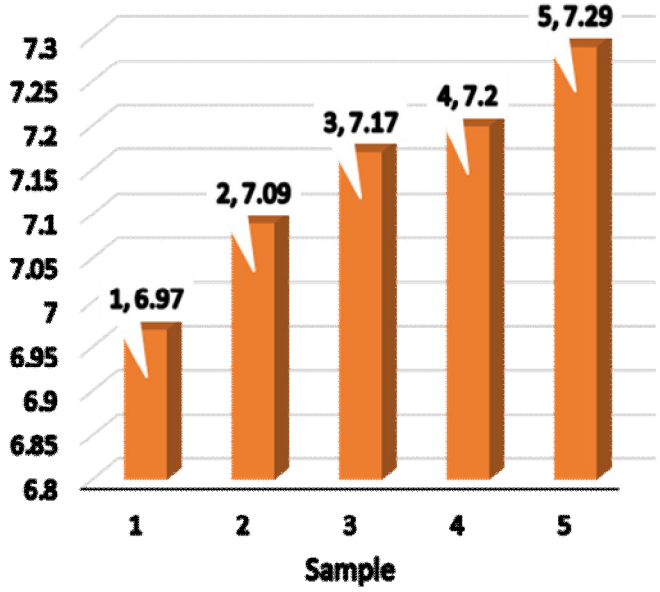
4) Fill 90% of sampling bottle with sample water from the bucket. Leave some space for oxygen to avoid killing the bacteria of sample water.
5) Close the bottle tightly.
6) Label the sample bottle with source, location, date and time

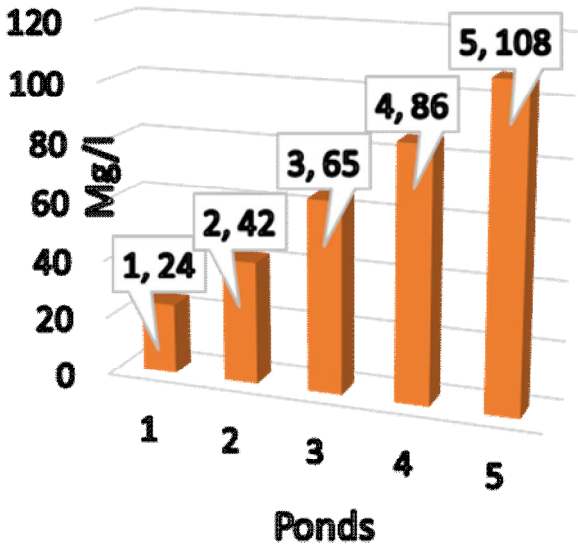
M. Protocol followed for Determination of pH

1) Turn the pH meter ON and allow it to warm for 15 minutes.
2) Standardize the glass electrode using standard buffer of pH 7.0 and calibrate with the buffer pH = 4 or pH = 9.2.
3) Take 50 ml of filtered water sample in 10 ml beaker and immerse the glass and calomel electrodes or combined electrode of the pH meter. Never allow the lower portion of glass electrodes to touch the bottom of the beaker.
4) While recording pH, switch the pH meter to pH reading, wait for 30 seconds and record the pH value to the nearest 0.1 unit. Put the pH meter in standby mode immediately after recording.
5) Remove the electrodes after each determination and carefully blot them dry with filter paper before the next determination. Standardize the glass electrodes after every ten determinations.

III.RESUTS AND DISCUSSION

Pond No	PH	Nitrate
1	6.97	24
2	7.09	42
3	7.17	65
4	7.2	86
5	7.29	108





A. Light and temperature test

The experiment of light and temperature test revealed that growth of the algae is seen only in the test tubes that are not covered with silver foil and placed in the normal room temperature

The density of growth is seen pictorial representation below (figure 3.1 and 3.2)

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Sample Number	01	02	03	04	05
DARK/Room Temperature					
LIGHT/Room Temperature					
DARK/Cool Temperature					
LIGHT/Cool Temperature					

Growth Scale

Low				**High**

Figure-3.1

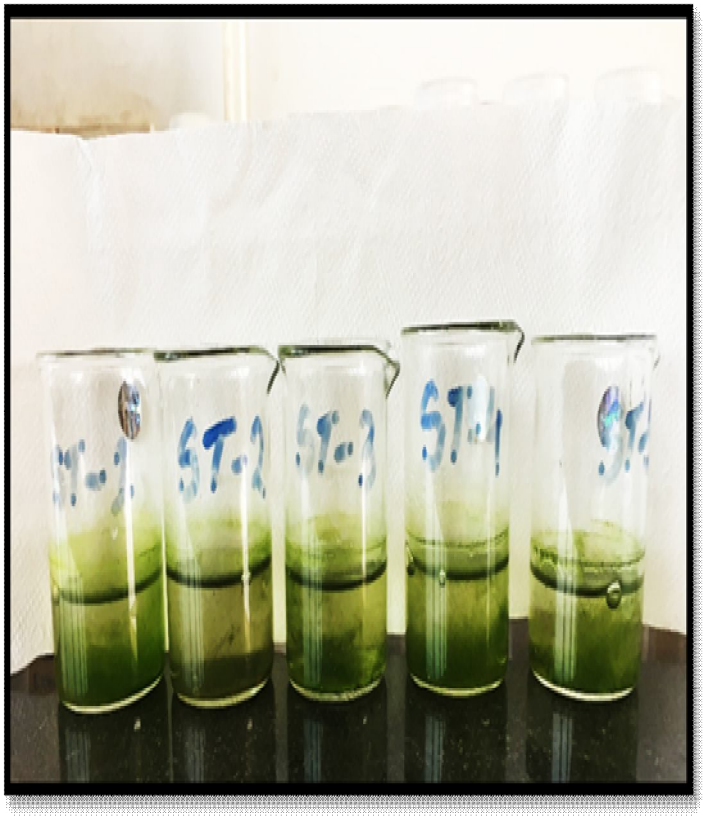
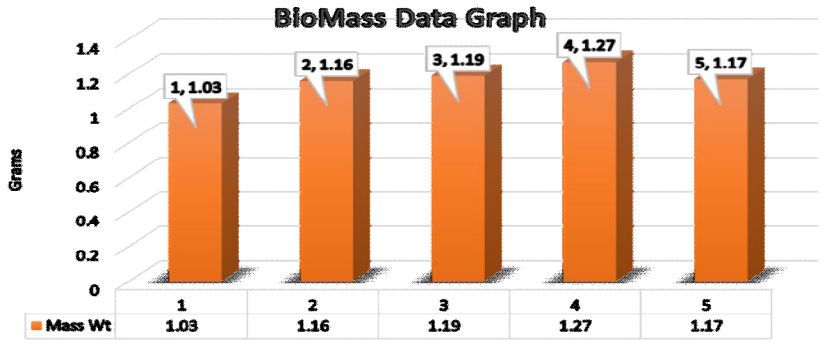


Figure-3.2

B. Biomass

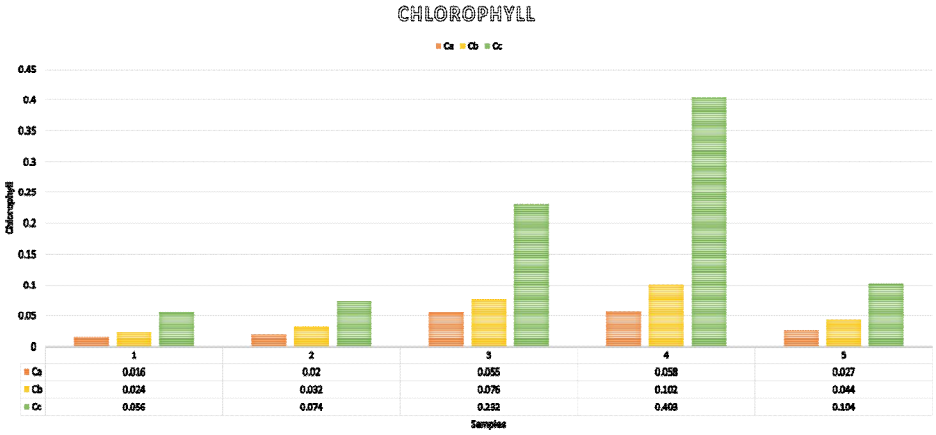
The experiment of Biomass test revealed that growth of the algae is seen more in the 4th Sample followed by the 3rd sample, 5th sample, 2nd sample and 1st sample that are not covered with silver foil and placed in the normal room temperature

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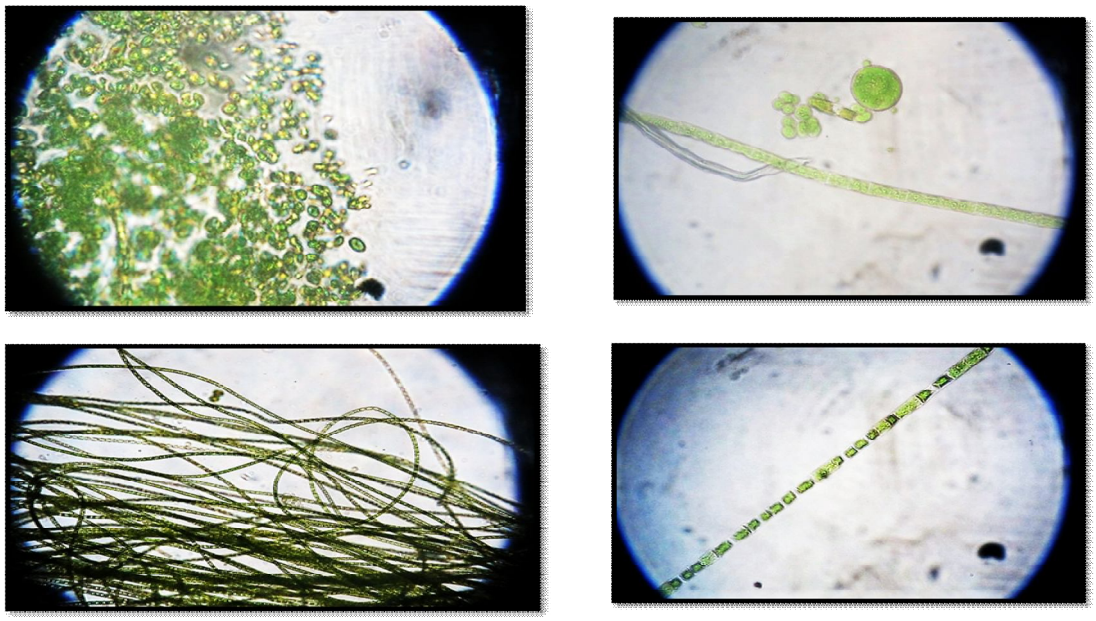
C. Chlorophyll Test

The experiment of Chlorophyll test revealed that Chlorophyll content of the algae is seen more in the 4th Sample followed by the 3rd sample, 5th sample, 2nd sample and 1st sample that are not covered with silver foil and placed in the normal room temperature



D. Specieshe

Algae Species that are seen grown in the experimental samples are *Oedogonium Sp* which is similar in all the 5 samples but there is a another algae called *Sphaerocystis Sp* which is seen in the sample 3 and 4 along with the previous species



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IV. CONCLUSION

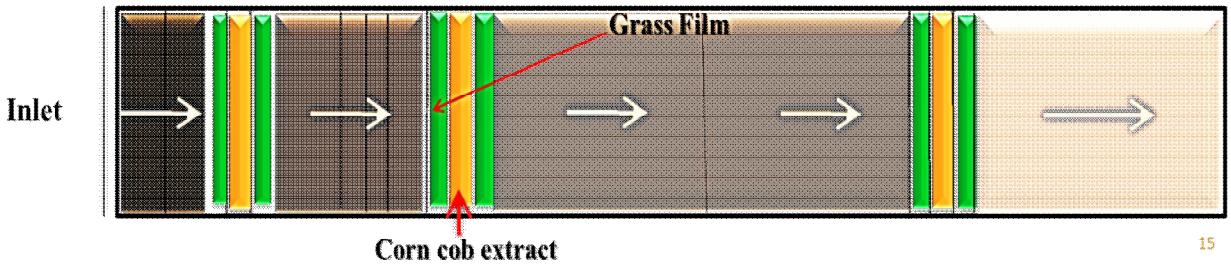
As hypothesized the experiment revealed that growth of the algae is seen the most in the presence of light and high temperature as we see the data in the previous section the Ph of 5 samples has kept on increasing in the five samples comparatively, the data also shows that there is a steep increase in the nitrate content but it is obvious that there is possibility of nitrogen fixation from the atmosphere too. The results show that the algal growth is most in the high nitrogen content sample in the presence of the high temperature and light. This Result is Supported by the Schindler (1977) and Fried (2003) study findings. However, their results showed both phosphorus and nitrogen content levels had the most algal growth, talking broadly Nitrogen is present in the waste water in a variety of forms because of the various oxidation states represented, and it can readily change form one state to another depending on the physical and bio-chemical conditions present. The total nitrogen concentration in typical municipal wastewater ranges from about 15 to over 50mg/L. about 60% of this in ammonia form (ammonia can be present in form of molecular ammonia or ammonia ions, usually at pH7 it is ammonia ions) and the reminder is in organic form.

According to Brunson (2004) algae is essential to aquatic life, for it produces dissolved oxygen via photosynthesis and takes up nitrogenous waste products from the water Runoff from nearby Sewage Treatment Plants. But like lot of other thinks too much is too Bad, as the Concentration of nutrients including phosphorus and potassium (Which is yet to be experimented) increases in the lakes the blooms becomes denser, there is increase in competition for nutrients. Eventually the algae uses up all the nutrients and dies. The dense algae blooms shading can also result in the accumulation of toxic wastes in the bottom of the lakes killing organisms populations and creating physiological stress.

This Case study experiment showed how the nitrogenous waste from the nearby Sewage treatment plants along with the nitrogen that is fixed from the atmosphere is being responsible for the impairments of the sanjay van lakes and a possible intervention of Bio-Bridge can help in fixing the issue to certain extent.

A. Recommendation

Bio Film Bridge The water pollution level is increasing day by day in the study area which may leads to the health hazards. We need sustainable, eco- friendly and cost effective approach for the sewage water treatment. Bio-Film Bridge is made up of Corn cob extract between the two grass Films which has the potential of Phytoremediation, when the polluted water is pass through the bridge the contaminants are adsorbed from the water to some extent.



B. Way Forward

1) Though initially the proposal was given very precisely, but latter realizing that they are several other inter-relations should be explored.
2) On this motive made a small attempt to study few correlations
3) But they are several physiological, bio-chemical inter-relations of algae with the aquatic ecosystem which includes the water and its organisms
4) The Difference in Species and Possible Causes can be explored in more depth

V. ACKNOWLEDGEMENT

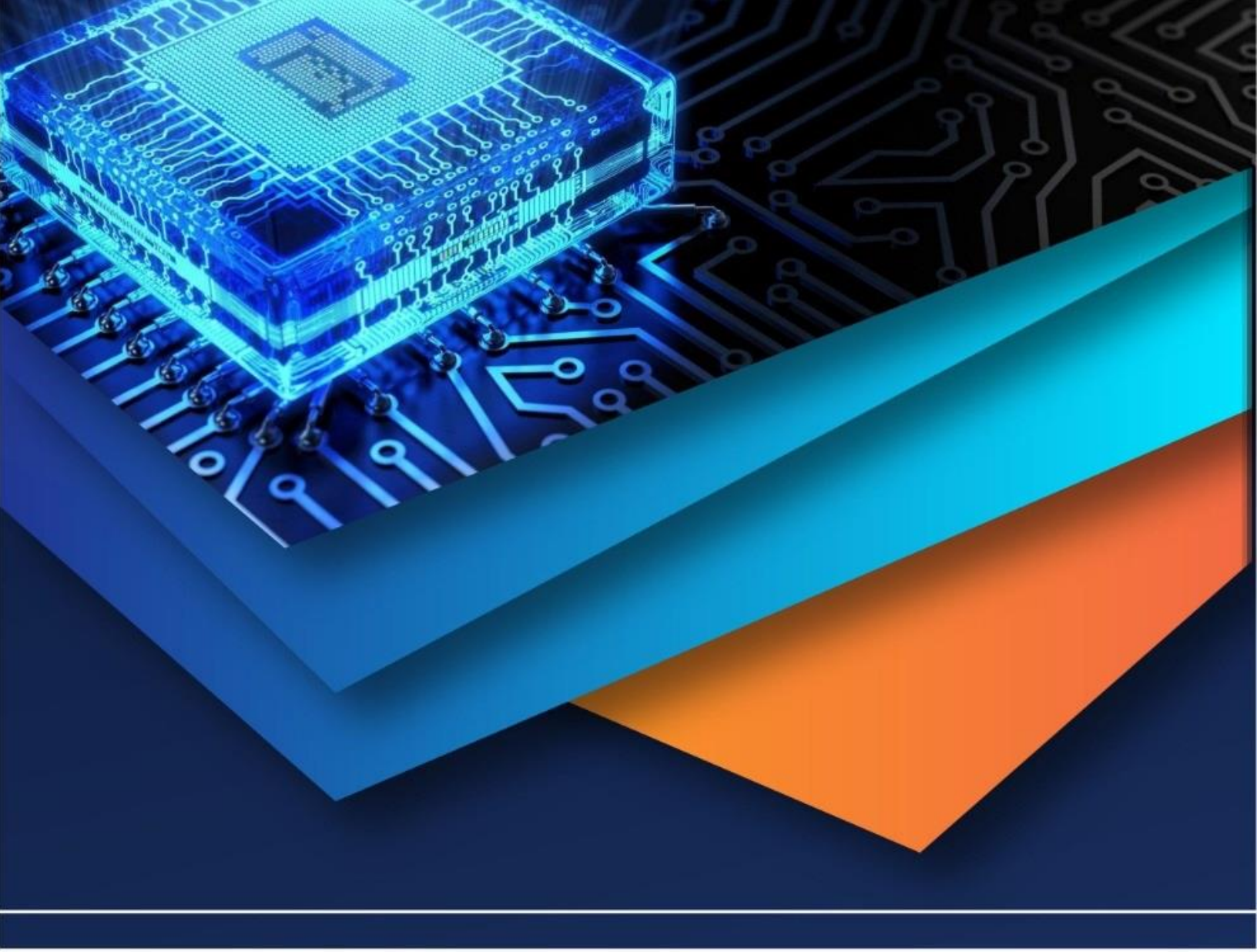
Bearing in mind I am using this opportunity to express my deepest gratitude and special thanks to Dr. Sudipto Chatterjee; Ms. Ranjana; Ms. Fawzia; Mr. Shashank; Ms.Trisha; Mr.Murgan . My best regards, deepest sense of gratitude to all my family and friends.

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