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Website: www.mutagens.co.in
E-mail: submit@mutagens.co.in
researchsubmission@hotmail.com

Research Paper

DETERMINATION OF PROTEINS AND DISCUSSION ON PLANT STRESS FROM THE POLLUTED WATERS OF MITHI RIVER THROUGH UV SPECTROPHOTOMER

More, Rushikesh S. and Sakshi S. Chaubal

The Institute of Science,
Madam Cama Road,
Mumbai – 32.

Abstract

Present paper deals with the extraction and estimation of Proteins from the polluted waters growing in the stressful environment of Mithi River, Mumbai. Samples were collected along the flow of the river of Mumbai which flows through residential and industrial complexes covering the area of around 15 kms. Plants mostly non-cultivated and dominant were collected randomly. The plants studied were *Avecinia marina, Ricinus communis, Peltophera inerme, Salvadora persica, Sida acuta, Ficus raecemosa,* and *Ficus hispida* . Spectrophotometric methods are regarded as classical methods and proteins estimation was performed using Lowry's spectophotometric method.
Key words: Mithi River, Proteins, Plant Stress, Pollution.

INTRODUCTION

Rivers are a major source of fresh water. It is therefore no surprise to find most of the major cities of the world situated on the banks of rivers. Rivers have been used as a source of water, for drinking, irrigation obtaining food, for transport, as a defensive measure, as a source of hydropower to drive machinery, for bathing etc. Rivers also provide an easy means of disposing of waste-water and, in much of the less developed world, other wastes. Water pollution is one of the main reasons why freshwater resources are constantly on decline.

Any change in the surrounding environment may disrupt the maintenance of a steady stable state of the plant. The flexibility of normal metabolism allows the development of responses to environmental changes which fluctuate regularly and predictably over daily and seasonal cycles. Condition that hampers the stable state of plant metabolism through environmental modulations is called as stress. Thus every deviation of a factor from its optimum does not necessarily result in stress. Stress begins with a constraint or with highly unpredictable fluctuations imposed on regular metabolic patterns that cause bodily injury, disease, or abnormal physiology. Stress is the altered physiological condition caused by factors that tend to alter the stability. Determination of Proteins in plants along the Mithi River was carried out to study stress.

Principle - The phenolic group of tyrosine and trytophan residues (amino acid) in a protein produces a blue purple color complex , with maximum absorption in the region of 660 nm wavelength, Folin- Ciocalteau reagent is used which consists of sodium tungstate molybdate and phosphate. Thus the intensity of color depends on the amount of these aromatic amino acids present and will thus vary for different proteins. Bovin Serum Albumin (BSA) is used as a standard protein, and is usually accepted universally because of its low cost, high purity and ready availability.

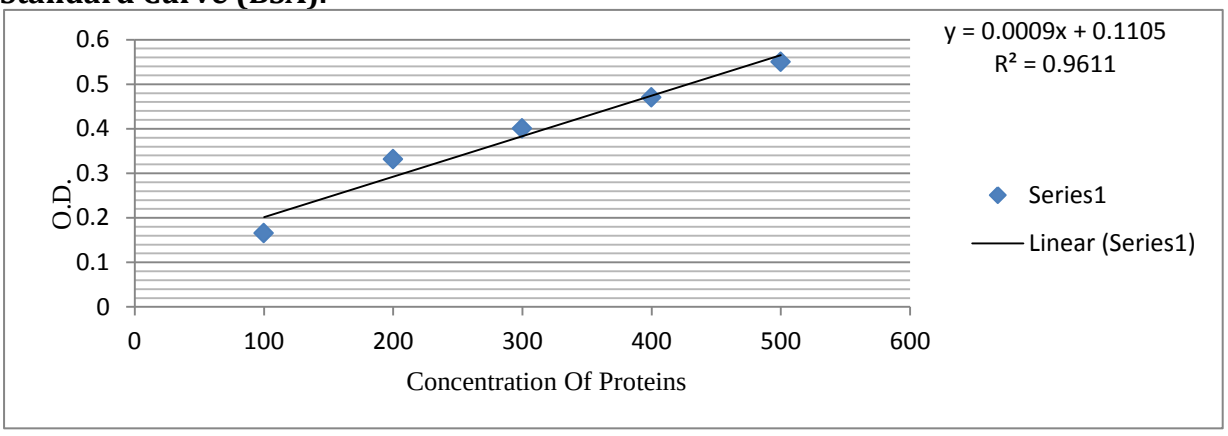
The area studied is the Mithi river of Mumbai that originates from the overflow of Vihar Lake and also receives the overflows from the Powai Lake. It flows for a total of 15 km before it meets the Arabian Sea at Mahim creek flowing through residential and industrial complexes covering the area from Powai to Bandra-Kurla, and Mahim (More and Chaubal, 2016). Mithi River meets Arabian Sea at mahim bay area.

MATERIAL AND METHODS

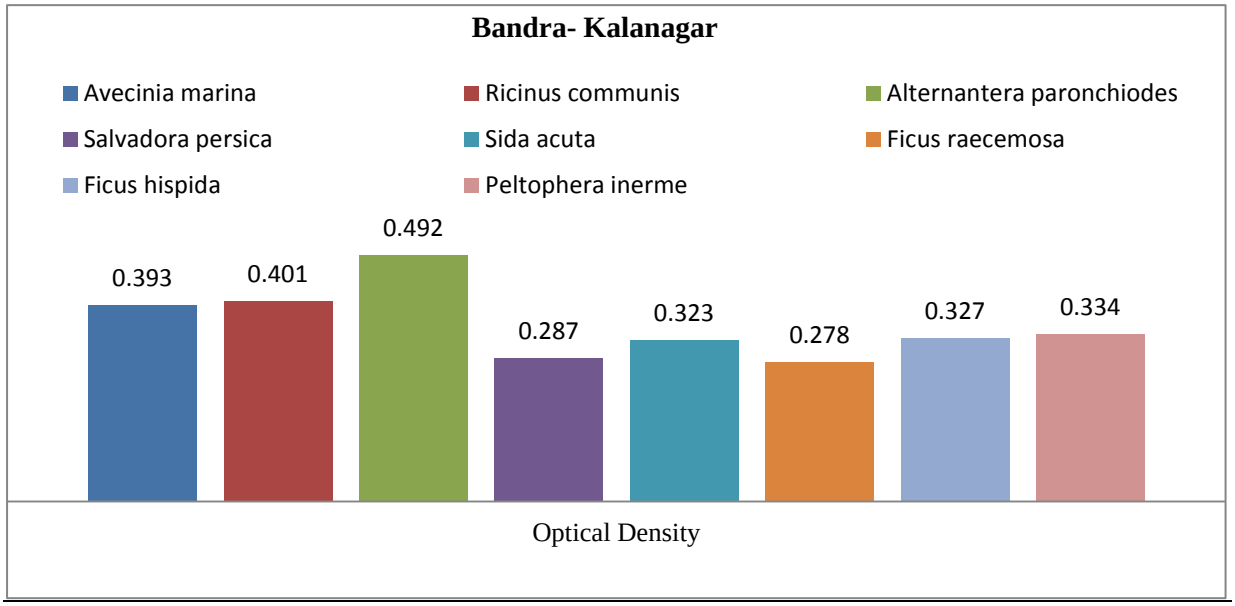
In this study, Nine commonly growning plant species growing along the banks of Mithi River, Mumbai. (viz. *R*icinus communis, *P*eltopera inerme, *A*vecinia marina, *A*lternanthera paronchiodes, *S*alvadora persica, *S*ida acuta, *F*icus raecemosa, *F*icus hispida.) were selected from five different locations for comparision and experimental purpose. The sampling stations selected according to their nature of diversities.

These species are mostly preferred to grow in moist condition under the shade in plane land areas. Healthy and uninfected plants species were collected at their stage of maturity and care was also taken during sampling of leaves to avoid any mechanical injuries. Fresh leaf samples were washed thoroughly first in tap water followed by distilled water in the laboratory, kept to dry in room temperature and analyzed for the determination of proteins. The protein estimation was carried out using lowry's method and absorbance was read at 660nm.

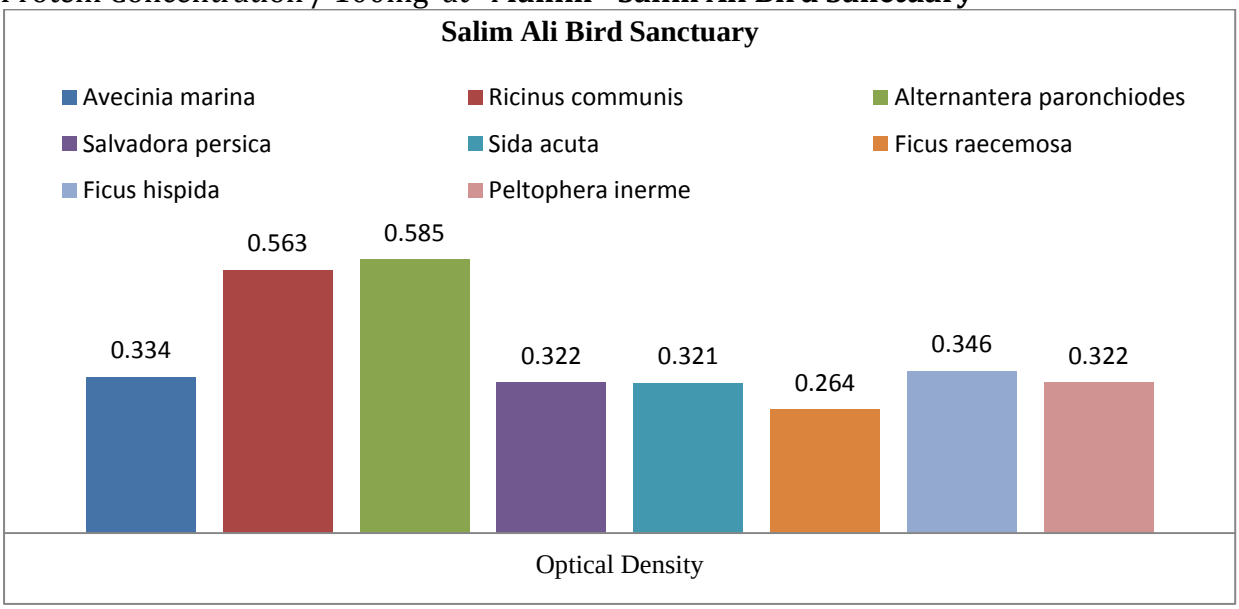
Standard Curve (BSA).



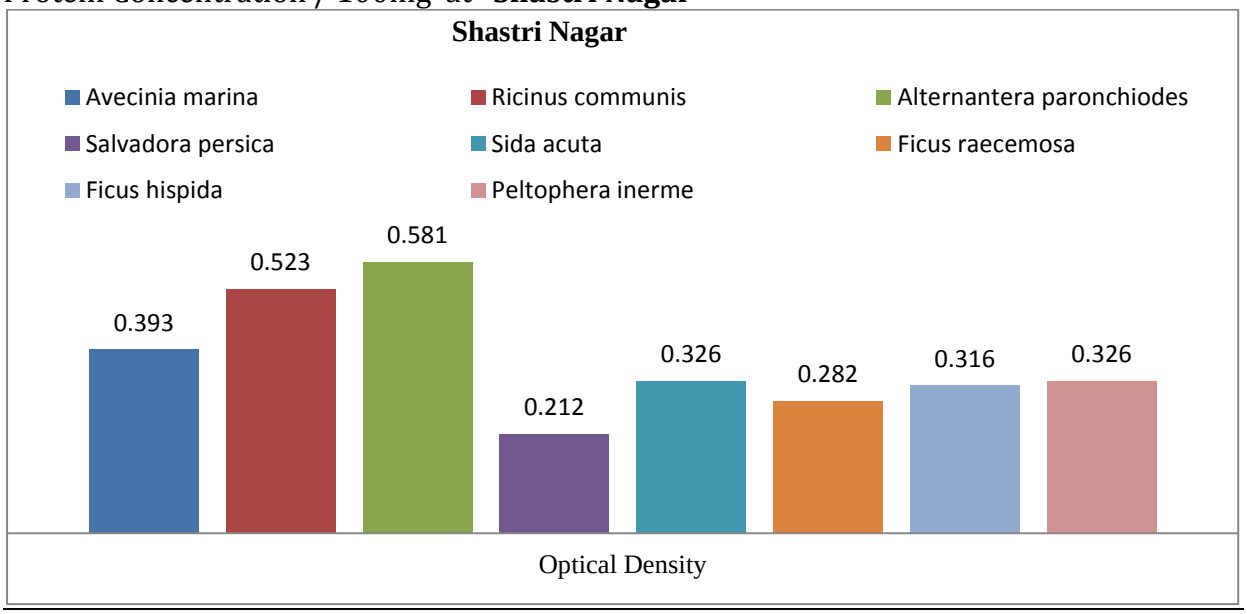
Protein Concentration / 100mg at **Bandra - Kalnagar**



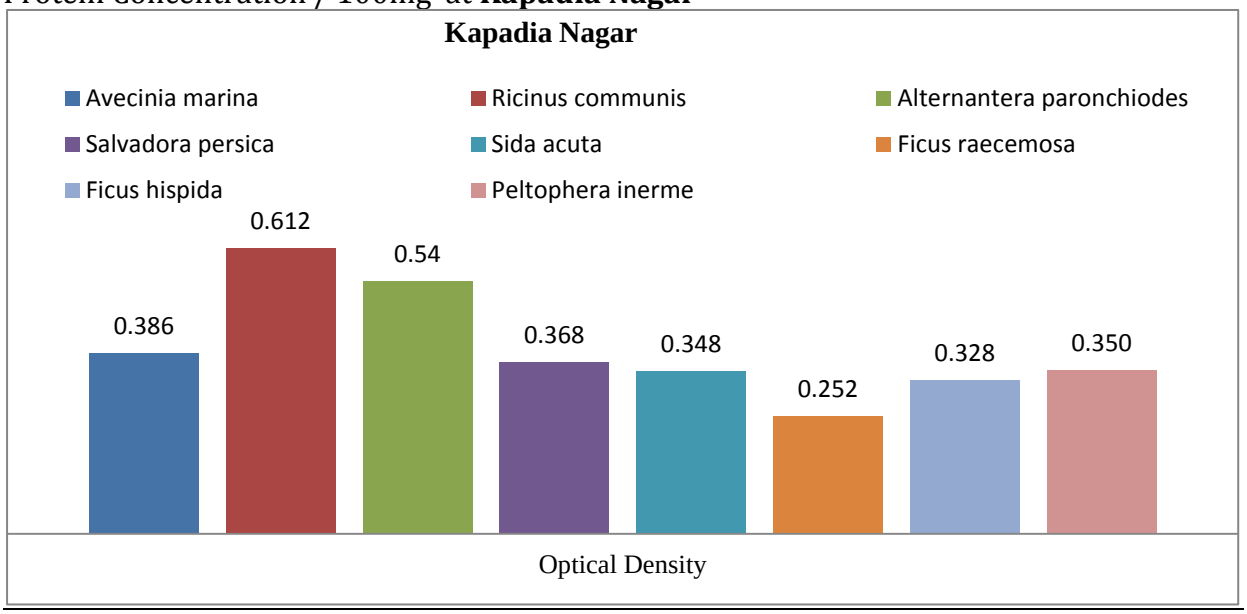
Protein Concentration / 100mg at **Mahim - Salim Ali Bird Sanctuary**



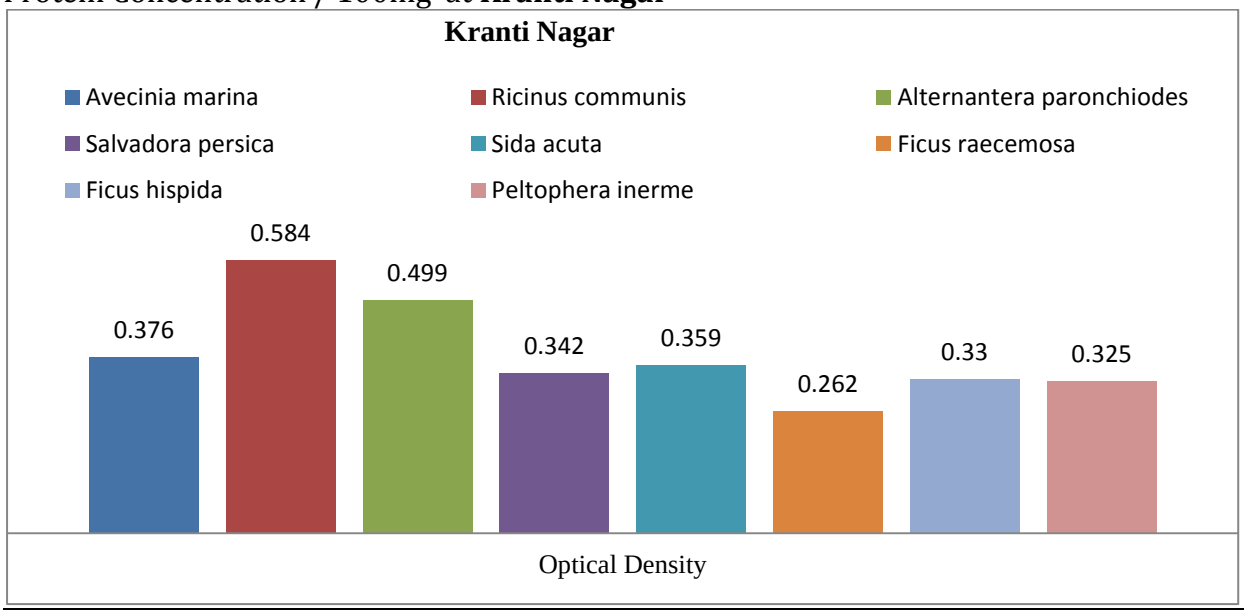
Protein Concentration / 100mg at **Shastri Nagar**



Protein Concentration / 100mg at **Kapadia Nagar**



Protein Concentration / 100mg at **Kranti Nagar**



RESULTS AND DISCUSSION

In the present investigation plants at all the sampling stations showed consistency in their protein concentration when compared to same plants at different sites. Lowry et al, (1951) findings support the readings obtained here. *R*icinus communis showed the highest amount of protein concentration amongsts other samples analysed.

During the Protein analysis *R*icinus communis showed the highest amount of protein concentration at Kapadia Nagar (0.612mg / 100mg). *A*lternantera paronchiodes showed higher concentration at (0.585mg / 100mg) at Maim Salim Ali. *F*icus Racemosa showed the higher concentration at Kapadia Nagar (0.252mg / 100mg). *A*vecinia marina showed lesser variation amongsts its concentration of proteins when compared to the same plant at other locations but the highest was recorded at Bandra Kalanagar (0.396mg / 100mg).

CONCLUSION

In the present study at all the sampling locations most of the plants showed less interference of pollution or external factors in their metabolism. As a result most of the plants analyzed here showed consistency in their results, irrespective of their location or extremity in climate.

But then Problems related to the environment and its ecosystem need to be discussed seriously. People should be educated about their activities which affect the natural ecosystem with a different approach. Proper policies and programs towards solving problems should be implemented. The present data on the mithi river and its rich plants ecosystem status also points out to the need for regular monitoring over the time.

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REFERENCES

1. Sapan, C. V., Lundblad, R. L., and Price, N. C., 1999, Colorimetric protein assay tech-niques.Biotechnol. Appl. Biochem.29,99–108.
2. Lowry, O. H., Rosebrough, N. J., Farr, A. L., and Randall, R. J., 1951, Protein measure-ment with the Folin phenol reagent. J. Biol. Chem.193,265–275.
3. Waterborg, J. H. and Matthews, H. R., 1984, The Burton assay for DNA, in Methods inMolecular Biology, Vol. 2: Nucleic Acids(Walker, J. M., ed.), Humana Press, Totowa, NJ,pp. 1–3.
4. Peterson, G. L., 1983, Determination of total protein. Methods Enzymol.91,95–121.
5. Markwell, M.A.K., Haas, S. M., Tolbert, N. E., and Bieber, L. L., 1981, Protein determination in membrane and lipoprotein samples. Methods Enzymol.72,296–303.
6. Yeang, H. Y., Yusof, F., and Abdullah, L., 1998, Protein purification for the Lowry assay:acid precipitation of proteins in the presence of sodium dodecyl sulfate and other biological detergents. Analyt. Biochem.265,381–384.
7. Chang, Y. C., 1992, Efficient precipitation and accurate quantitation of detergent-solubilized membrane proteins. Analyt. Biochem.205,22–26.
8. Hess, H. H., Lees, M. B., and Derr, J. E., 1978, A linear Lowry-Folin assay for both water-soluble and sodium dodecyl sulfate-solubilized proteins. Analyt. Biochem.85,295–300.
9. Larson, E., Howlett, B., and Jagendorf, A., 1986, Artificial reductant enhancement of the Lowry method for protein determination. Analyt. Biochem.155,243–248.
10. Shakir, F. K., Audilet, D., Drake, A. J., and Shakir, K. M., 1994, A rapid protein determination by modification of the Lowry procedure. Analyt. Biochem.216,232–233.