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ALGAE AS INDICATOR OF WATER POLLUTION IN LAKOTIA RESERVIOR OF PALI CITY (RAJASTHAN)

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Pali is famous for textile dying and printing industries. The Potable water for the occupants of the city is drawn from the Lakotia reservior situated in the heart of the city. The reservior is subjected to an acute pollution problems due to addition of the discharged domestic wastes, industrial effluents containing detergents, caustic soda, acids, dye products and other organic and inorganic chemicals of toxic nature. Certain algal forms not only grow in the reservoir but also act as indicator of water pollution. The present study has revealed forms of chlorophyll containing protozoan - *Euglena* and several algal forms belonging to Chlorophyceae, Cyanophyeae and Bacillariophyceae.

Keywords : .Textile dying and Printing industry; Lakotia reservior; Raw Water quality; Water blooms; Pollutants.

Introduction

Pali is situated in western Rajasthan and is one of the important textile processing centres of India. The drinking water is supplied to the city population through the Public Health and Engineering Department (PHED). The raw water is drawn from the Lakotia reservoir situated in the heart of the city. The rapid establishment of textile dying and printing units coupled with population growth has witnessed marked deterioration in the water quality of the reservoir. It is mainly caused by continued addition of domestic sewage and discharged industrial effluents which contain caustic soda, acids, dye products, detergents and numerous other compounds of toxic nature. The reservoir is also surrounded by roads and thus provide an easy approach for defaecation. The added faecal matter contain millions of pathogenic microorganisms. Kolkuitz and Marsion (1909) reported application of biological data for the assessment of water quality through 'Saprobien system'. Bick et al. (1967) carried out preliminary findings concerning potentialities of the 'European Saprobity system' for monitoring the water quality under tropical conditions in India. Patric (1973) assessed water quality through studies on the diatoms. It is now evident that certain algal forms grow in special type of water and acts as reliable indicator of organic pollution and eutrophication. (Sawyer, 1947; Prescott, 1948; Singh, 1953; Palmer, 1969; Rai and Kumar, 1979; Mohanty; 1985; Kant, 1985 and Kanan and Krishnamoorthy, 1985). The present survey lay an emphasis on the observed aquatic forms of Euglena, diatoms and other algae tolerent to the organic wastes, relatively undecomposed domestic sewage, and effluents of textile processing industries.

Materials and Methods

Round the year (January, 91 to December, 91) monthly collection of *Euglena* and algae was carried out from the Lakotia reservoir. The samples were

TABLE 1

POLLUTION TOLERANT SPECIES OF ALGAE AND *EUGLENA* IN LOKATIA RESERVOIR OF PALI.

S.No.	Class	Forms
1.	Protozoa	*Euglena anabaenae*
	Euglenaceae	*Euglena granulata*
		Euglena pisciformis
		Euglena stellata
2.	Algae	*Pediastrum tetras*
	a) Chlorophyceae	*Coelastrum microsporum*
		Chlorococcum infusionum
		Pediastrum duplex
		Pandorina morum
		Cosmarium contractum
	b) Cyanophyceae	*Oscillatoria formosa*
		Oscillatoria subbrevis
		Oscillatoria chlorina
		Oscillatoria limosa
		Oscillatoria princeps
		Microcystis aeraginosa
	c) Bacillariophyceae	*Cyclotella meneghiniana*
		Navicula cuspidate
		Cymbella turgida
		Stauroneis partabgarhensis

collected between 15th and 20th day of every month. The standard methods of collection, preservation and identification were followed.

Results and Discussion

The species of observed algae and *Euglena* are listed in the Table 1. Five species of *Oscillatoria* were collected from the moist soils near the bank of reservoir. These species constitute important benthic primarty producers. Besides one species of *Microcystis* and four species of chlorophyll containing protozoan - *Euglena* were also observed. The chlorophyceae was represented by six species viz; *Pediastrum tetras, Coelastrum microsporum, Cosmarium contractum, Pandorina morum, Pediastrum duplex* and *Chlorococcum infusionum.* These together with *Microcystis*, and diatoms (Table 1) formed well developed water blooms on the surface of the reservoir. The species of *Osciliatoria, Microcystis* and *Euglena* are considered as reliable indicator of eutrophication and organic pollution of the water bodies (Sawyer, 1947; Prescott, 1948; Singh, 1953 and present inverstigation). Palmer (1969) identified species of *Euglena, Oscillatoria, Chlorella, Nitzschia, Stigeoclonium,* as biological indicator of organic pollution. The high tolerance to organic pollution was also observed with *Schizomeris leeibleinii, Stigeoclonium* and *Oscillatoria* species (Rai and Kumar, 1979). Diatoms were also recorded to be effective indicator of water quality (Kanan and Krishnamoorthy, 1985). The presently surveyed Lakotia reservoir was found to be polluted by multiple sources viz; discharge of effluents from nearby textile industrial units, defaecation and dumping of municipal garbages etc. Besides, cattles and human excreta is constantly poured into the water through out the year. The observed forms of green and blue green algae were positively buyant and very often cause water blooms. The species of *Microcystis, Oscillatoria* and *Euglena* clearly indicated process of 'eutrophication' and organic pollution of water. The observed species of *Microcystis* were also reported to produce and liberate toxins in water (Taylor, 1980). The occurence of algal forms highly tolerant to the organic pollution was thus suggestive of deterioration of raw water quality of the Lakotia reservoir. Unfortunately the reservoir is the main source of the potable water for the inhabitants of the Pali City. Unless proper remedial measures are undertaken the ingested water may pose serious health hazards in near future.

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References

Bick H Krishnamoorthy K P and Laxmi Narayanan JSS 1967, Preliminary findings concerning the potentialities of the European Saprobity system for monitoring water quality under tropical conditions in India W.H.O. EBL. pp. 1-47

Kanan L and Krishnamoorthy K P 1985, Diatoms as indicators of water quality in 'Advances in Applied Phycology' (Eds. A.C. Shukla and S.N. Pandey). Int. Soc. Plant Environmentalistic, pp. 87

Kant S 1985, Algae as indicator of Organic Pollution Op. Cit., pp. 77

Kolkuits R and Marson M 1909, Int. Rev. Hydrobiol, **2** 126

Patric R 1973, In: Biological methods for the assesment of water quality, ASTM. STP 528 AM. SOC for testing and materials. pp. 79

Palmer C M 1969, *J. Phycol.* **5** 78

Prescott G W 1948, Objectionable algae and their control in lakes and reservoirs Rep. Lusiana Municipal Rev. Shrevaport I. pp. 1

Mohanty R C 1985, In: Advances in Applied Phycology (Eds. A.C. Shukla and S.N. Pandey). Op. Cit. pp. 92

Rai LC and Kumar H D 1979, In: Recent Researches in Plant Sciences, Kalyani Publish. New Delhi, pp. 12

Sawyer C N 1947, *J. New Wat.WKS ASS.* **51** 109

Singh R N 1953, Verh Int. Ver. Ther Anew Limonol, **12** 831

Taylor F J R 1980, In: The physiology and ecology of phytoplanktons (Ed. I. Morris) Blackwell Scientific Publ., Oxford. pp. 109