IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 3, March 2021

DOI: 10.17148/IARJSET.2021.8315

Studies on Fluoride contents and Algal diversity of Mahapur and Saai Reservoir Latur, Maharashtra

Yadav S.G

Department of Botany, Shivaji Mahavidyalaya, Renapur Dist. Latur; 413527 (M.S.)

Abstract: Mahapur and Saai, both the reservoirs are constructed on Manjra River in Latur tehsil in the Marathwada region of Maharashtra. The Mahapur reservoir is just 10kms and Sai reservoir is just 08 kms away from the Latur town. The water bodies are, mainly used for drinking and irrigation purposes. The study was carried out over a period of one year from March 2018 to February 2019 to examine the different concentrations of fluorides and algal diversity at selected two sites. From findings an average concentration of fluoride in Mahapur water body at both sites was 0.34mg/lit.,and in Saai water body it was 0.32mg/lit, at site S1and 0.35mg/lit, at site S2. (Table.1) The fluoride concentration was maximum in the month of May and it was minimum in the month of December at each site.As far as algal diversity concern a total of 182 taxa under 63 genera were encountered from both the reservoirs. The present paper deals with only the common taxa (82) under (35) genera encountered from both the reservoirs (Table 2) belonging to chlorophyceae cyanophyceae euglenophyceae and xanthophyceae .The members of chlorophyceae were found dominant.

Key words- Fluoride, Mahapur, Saai reservoir, Manjra River, Renapur.

INTRODUCTION

The algal diversity from different aquatic habitats were extensively studied in India. In present century great advances have been made in the investigations of fresh water algae marine algae soil algae and particular attentation has been paid to their taxonomy ,ecology, and applied aspects, but very few workers have paid attentations on algal diversity in Marathwada region of Maharashtra, Ashtekar (1980),Andhale (2008),Talekar (2009),Yadav (2010) although the climatic conditions are most suitable to grow algae luxuriantly and in diverse form and hence, it has been decided to study the concentration of fluorides and algal diversity in water body of Mahapur and Saai reservoirs.

Water is the key element in socio-economic development of Nation. Water cannot be created though what ever technical advancements we made. It is the nature's free gift to the mankind race. Which often contains biological or chemical agents, detrimental to health? One of such chemical contents is fluoride. Fluoride is the most electronegative of all chemical elements, highly reactive so never encountered in nature in the elemental gaseous form but only in combined form.

It is well known that the excess fluoride intake is responsible for dental and skeletal fluorosis. The problem of fluorosis has been known in India for a long time. The disease earlier called “mottled enamel” was first reported by Vishanathan (1935) to be prevalent in human beings in Madras Presidency in 1933. Mahajan (1934) reported a similar disease in cattle in certain parts of old Hyderabad state. However, Shortt (1937) was the first to identify the disease as “fluorosis” in human beings in Nellore district of Andhra Pradesh. The fate of fluoride in the soil environment and groundwater is of concern for several reasons. It is generally accepted that fluoride stimulates bone formation (Richards et al., 1994) and small concentration of fluorides have beneficial effects on the teeth by hardening the enamel and reducing the incidence of caries (Fung et al. 1999).

Fluoride is present in the teeth, bones, thyroid gland and skin of animals. It plays an important role in the formation of dental enamel and normal mineralization in bones but can cause dental fluorosis and adversely affect the central nervous system, bones, and joints at high concentrations (Agarwal et al., 1997).

Fluorosis is caused by high fluoride intake from drinking water, food, air, medicines and cosmetics (Gupta *et al.*, 1994). Fluorides also reduced the chlorophyll pigments and protein contents in the plants (Malik and Arya, 2008).

MATERIAL AND METHODS

The samples of water for the analysis were collected freshly early in the morning on dated 7th in each month from March 2018 February 2019. Fluoride content was estimated by APHA (1989).The algal samples were collected from the selected sites of reservoirs in acid washed collection bottles. The samples were immediately brought to the laboratory and preserved in 4% formalin added with 5% glycerin for further taxonomic investigations. The algae were identified under light microscope by referring standard monographs and literature, Prescott (1951), Desikachary (1959),Philipose (1967).

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 3, March 2021

DOI: 10.17148/IARJSET.2021.8315

RESULTS AND DISCUSSION

Part A: Fluoride concentration of water samples in Mahapur water body is shown in table-I. It was found that the concentration of fluoride at site S1 was in the range of 0.25 mg/lit. to 0.46 mg/lit. having an average 0.34 mg/lit. The concentration of fluoride at site S2 was in the range of 0.28 mg/lit. to 0.44 mg/lit having an average 0.34 mg/lit. The fluoride concentration of water samples in Saai water body at site S1 was in the range of 0.27 mg/lit. to 0.43 mg/lit having an average 0.32 mg/lit and the concentration of fluoride at site S2 was in the range of 0.28 mg/lit. to 0.45 mg/lit having an average 0.35 mg/lit.from July 2018 to June 2019.Comparatively both the water body shows average floride concentration (0.32 mg/lit.to 0.35mg/lit and Similar findings were observed in various reservoir in India were reported by many authors (Gupta *et al* 2000, Sreenivasrao *et al* 2001, Singh 2002, Pawale and Hembade 2007). The highest concentration of fluoride was found in the month of May 2018 and the lowest concentration was observed in the month of December 2018. (Table.1)

The high fluoride content in water is generally associated with low concentration of Calcium, Magnesium and high concentration of bicarbonates and nitrates ions (Gupta, 1991).

The permissible limit of fluoride content in drinking water recommended by ISI and WHO is 1.0 mg/lit. But Teotia and Teotia (1984) suggested the maximum permissible limit of fluoride was 0.5mg/lit. From the above findings it can be concluded that the water of Mahapur and Saai reservoirs is unsafe for drinking purposes in the month of May because the concentration of fluoride in this month was high (0.43mg/lit.to 0.46mg/lit).

Part 2: As far as algal diversity concern a total of 182 taxa under 63 genera were encountered from both the reservoirs.The present paper deals with only the common taxa (82) under (35) genera encountered from both the reservoirs (Table 2and 3) belonging to chlorophyceae, cyanophyceae ,euglenophyceae and xanthophyceae .The members of chlorophyceae were found dominant,Ashtekar (1980),Yadav (2010).

Table-1. Monthly fluoride concentration of Mahapur and Saai Reservoirs in year 2018-19.

		Mahapur Reservoir		Saai Reservoir	
Sr. No.	**Month**	**Fluoride Conc. (Mg/lit.) S1**	**Fluoride Conc. (mg/lit.)S2**	**Fluoride Conc. (mg/lit.) S1**	**Fluoride Conc. (mg/lit.) S2**
01	March 2018	0.38	0.36	0.33	0.36
02	April 2018	0.42	0.40	0.36	0.41
03	**May 2018**	**0.46**	**0.44**	**0.43**	**0.45**
04	June 2018	0.44	0.42	0.41	**0.45**
05	July 2018	0.41	0.38	0.36	0.39
06	August 2018	0.36	0.35	0.34	0.37
07	September 2018	0.31	0.28	0.26	0.31
08	October 2018	0.28	0.32	0.30	0.33
09	November 2018	0.26	0.33	0.31	0.31
10	**December 2018**	**0.25**	**0.28**	**0.27**	**0.28**
11	January 2019	0.29	0.30	0.28	0.29
12	February2019	0.33	0.32	0.30	0.28
	Average---	**0.34**	**0.34**	**0.32**	**0.35**

Table 2: Total occurrence of Common Algal taxa from both Reservoirs:

Sr. No.	Class	Genera	Species
1	Chlorophyceae	18	40
2	*Euglenophyceae*	03	12
3	*Xanthophyceae*	01	01
4	*Cyanophyceae*	13	29
	Total	35	82

IARJSET

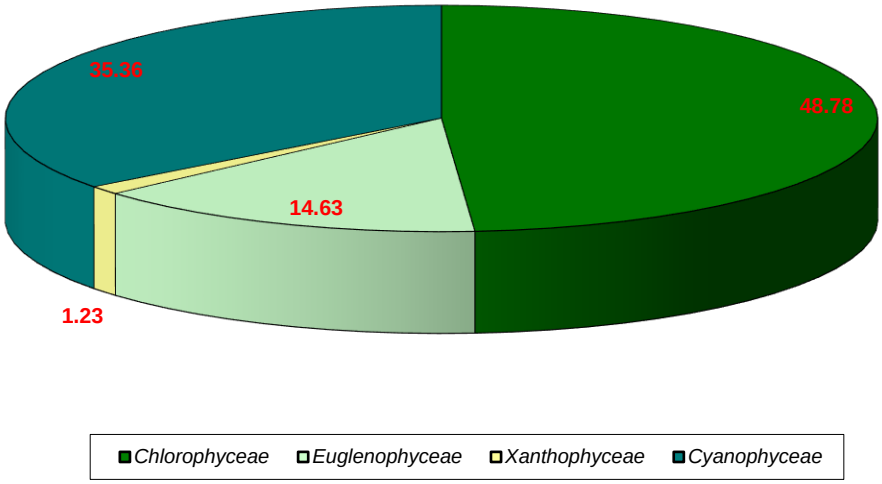
ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 3, March 2021

DOI: 10.17148/IARJSET.2021.8315

Graph 1: Classwise percentage contribution ofCommon Algal flora in both Reservoirs.
(values in percentage)



Chlorophyceae: *Sphaerocystis schroeteri, Gloeocystis ampla, Gloeocystis major, Gloeocystis planctonia, Gloeocystis vesiculosa, Elakatothrix gelatinosa, Elakatothrix viridis, Ulothrix zonata, Oedogonium inconspicuum oedogonium pisanum, Trochiscia granulata, Micractinium pusillum, Pediastrum duplex v. cohaerens, Pediastrum duplex v. gracilimum, Pediastrum duplex v. reticulatum, Pediastrum tetras v. tetradon, Oocystis eremosphaeria, Nephrocytium limnecticum, Nephrocytium lunatum, Ankistrodesmus falcatus, Ankistrodesmus falcatus v. mirabilis, Selenastrum bibraianum, Selenastrum gracile, Kirchneriella lunaris, Coelastrum proboscideum, crucigenia tetrapedia, Scenedesmus acutiformis, Scenedesmus bijugatus, Scenedesmus longus v. dispar, Scenedesmus opoliensis, Scenedesmus quadricauda, Scenedesmus quadricauda v. longispina, Scenedesmus quadricauda, v. parvus, Scenedesmus quadricauda v. quadrispina, Mougeotia floridana, Cosmarium laeve v. westii, Cosmarium pseudoprotuberans, Cosmarium schmidtianum, Cosmarium sexangulare, Cosmarium tetragonum.*

Euglenophyceae: *Euglena convolata, Phacus aenigmaticus, Phacus anomalus, Phacus arnoldii, Phacus brachykentron, Phacus brevicaudatus, Phacus caudatus, Phacus grannum, Phacus helicoides, Phacus longicauda v. insecta, Trachelomonas playfairii, Trachelomonas volvocina v. punctate*

Xanthophyceae: *Ophiocytium bicuspidatum*

Cyanophyceae: *Microcystis flos-aquae, Chroococcus giganteus, Chroococcus minor, Aphanocapsa banaresensis, Aphanocapsa pulchra, Gomphosphaeria aponina* v. *cordiformis, Merismopedia tenuissima, Arthrospira, Khannae, Spirulina major, Spirulina meneghiniana, Oscillatoria claricentrosa* f. *bigranulata, Oscillatoria martini, Oscilatoria ornata v. crassa, Oscillatoria rubescens, Lyngbya confervoides, Lyngbya hieronymusii, Lyngbya laxespiralis, Lyngbya major, Lyngbya majuscula, Lyngbya martensiana, Lyngbya perelengans, Lyngbya semiplena, Lyngbya spiralis, Anabaenopsis cirularis, Cylindrospermum sphaerica* f. *cylindricum, Calothrix clavatoides, Calothrix thermalis, Gloeotrichia raciborskii* v. *bombayense, Gloeotrichia raciborskii* v. *longispora.*

REFRENCES

[1].Andhale S.B."Studies on the flora of Jayakwadi Bird Sanctuary". Ph.D. Thesis, Dr.Babasaheb Ambedkar Marathwada UniversityAurangabad.2008.
[2].Ashtekar, P.V. "Studies on fresh water algae of Aurangabad district" Ph.D. thesis, Marathwada University, Aurangabad. 1980.
[3]. Arnold, E. Greenberg .APHA, **"**Standard methods for the examinations of water and waste water": 450-F-D Spands Method: 4-89. 1989.
[4].Agrawal, V., Vaish, A.K. and Vaish, P. Ground water quality: Focus on fluoride and fluorosis in Rajasthan. Current Sci. 73(9): 743-746.1997.
[5].Claus, G. and Reimer, C.W."A Quantitative and Qualitative study of the phytoplankton of the Danube River at Vienna". *Revista De Biologia* **2(3-4):** 261-275. 1961.
[6].Collins, F.S.Green algae of North America. G.E. Strechert and Co. New York.1928.
[7].Desikachary T.V.Cyanophyceae *I.C.A.R.* Monographas on Algae New Delhi. **pp.** 680. 1959.
[8].Forest, H.S.Handbook of Algae. The University of Tenesse Press, Knoxville.1954.
[9].Fung, K., Zahang, Z., Wong, J. and Wong, M., "Fluoride content in tea and soil from tea plantations and release of fluoride into tea liquor during infusion". Environ. Pollut. 104: 197-205.1999
[10].Gupta, S. C. "Chemical characters of ground water in Nagpur district, Rajastan". *Indian Jou. Env. Health*, **33**:341-349. 1991.

IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 3, March 2021

DOI: 10.17148/IARJSET.2021.8315

[11].Gupta, M. K., Vibha Singh, Poonam Rajwanshi, Shalini Srivastva and Sahab das.Fluoride in ground water at Agra. Indian Jou. Env.Health, 36(1):43-46.1994.
[12].Gupta, S. C., Rathore, G. S.and Mathur, G. C.Hydro-Chemistry of Udaipur lake. Indian Jou. Env. Health, 43(1):38-44. 2000.
[13].Hosmani, S.P. and Bharati, S.G."Algae as indicators of organic pollution" *Phykos.* **19 (1):** 23-26.1980.
[14].Jadhav Milind, Amrapali Bhagat and Savita Salve .Algal Biodiversity of Salim Ali lake of Aurangabad Maharashtra, Abstract, *Nat. Conf. of modern trends in Plant Sci* Dr. B.A.M.U. Aurangabad, 66.2007.
[15].Kamat, N.D.The algae of Kolhapur, India. *Hydrobiologia* **22:** 209-305.1963a.
[16].Kamat, N.D.The algae of Mahabaleshwar. *J. Univ. Bombay.* **31:** 28-41.1963b.
[17].Kamble, S.M. "Studies on effect of bioactive compounds of algae on some fungi". Ph.D. thesis, Dr. B.A.M.U. Aurangabad. 2008.
[18].Mahajan, Annual Report. VIO Hyderabad State, 3, Indian Council of Agricultural Research, New Delhi.1934.
[19].Malik, R.P.S. and K.P.S. Arya. **"**Effect of Study of Flouride toxicity on chlorophyll, protein and energy content of Urdbean" (*Vigna mungo* L. Hepper) and Mungbean (*Vigna radiate* L. Wilczek). *International Journal of Plant Sciences*, Vol.3 No.2: 382-384.2008.
[20].Nandan, S.N. and Patel R.J. Ecological studies and algal flora of Vishwamitri river, Baroda, Gujarat, *India. J.P.I.Nature.* **(1):** 17-22.1984a
[21].Pawale, R.G. and A. S. Hembade. "Fluoride content of Vishnupuri project at Nanded district, Maharashtra". Ecotoxicol. Environ. Monit. 17(4):341-345.2007.
[22].Phllipose.M.T.Chlorococcales.*ICAR.*Monograph, New Delhi. **P**. 365.1967.
[23].Prescott G.W. Algae of the Western great lakes area. Granbrook Institute of Science, Michigan.1951.
[24].Richards, A., Moskilder, L. and Sogaard, C.H., Normal "Age-related changes in fluoride content of vertebral trabecular bone-relation to bone quality. Bone 6:15-21.1994.
[25].Short, W.E., Endemic Fluorosis in Nellore District, South India. Indian Medical Gazette, 72: 396.1937.
[26].Singh, A. Quality assessment of surface and subsurface water of Damodar river basin. Indian Jou. Env. Health, 44(1):41-49.2002.
[27].Sreenivasrao, A., Rammohanrao, A., Someshwarrao, N. "Quality of drinking water from ponds in villages of Kolleru lake region". Indian Jou. Env. Health, 43(1):45-52.2001.
[28].Teotia, SPS and Teotia, M. Endemic fluorosis in India. A challenging National Health Problem. Japi. Vol.32, No.4:347-352.1984.
[29].Viswanathan, G.R., Annual Report Madras. Indian Council of Agricultural Research, New Delhi. (Quoted from Indian Institute of Science, 33A, 1, 1951).1935
[30].Yadav S.G. and P.V. Ashtekar. A preliminary survey of Desmids form Bindusara Dam, Beed. Abstract *Nat. Conf. on Modern trends in plants sciences*, Dr. B.A.M.U. Aurangabad 66. 2007.

BIOGRAPHY

Papers Published in International Journal	: - 48
Papers Published National level	: - 19
Books Published	: - 01
Paper/Article/Chapter Published in	: - 08
Papers/Articles Accepted	: - 02
Papers Communicated	: - 04
Abstracts Published	: - 09
Papers Presented in International Conference	: - 10
Papers Presented in National Conferences	: - 31
Papers Presented in State level Seminar/Conf.	: - 11