



Diatoms of Cement Industry Waste Water

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Abstract

Diatoms are the autotrophic element of aquatic ecosystem each ecosystem have its won flora and fauna. They are common unicellular symmetrical golden or brown green plants in fresh water, marian water and polluted water. They are regarded of pollution indicators. The present paper deals with the study of Diatoms in cement industry waste water. These industry is situated in MIDC area of Beed. To study the diatoms diversity of cement industry waste water during the period of June 2016 to May 2017. Thirty six taxa from sixteen genera of diatoms were recorded from cement industry waste water. In present study sixteen genera of diatoms uiz *Cyclotella*, *Fragilaria*, *Synedra*, *Anomoconeis*, *Cocooneis*, *Achnanthes*, *Gyrosigma*, *Coloneis*, *Neidium*, *Navicula*, *Pinnularia*, *Amphora*, *Cymbella*, *Gomphonema*, *Nitzschia* and *Surirella*. Seasonal variation study reveals dominance of Diatoms is in the month of summer followed by winter and monsoon. Similarly pH and Temperature is in the month of summer followed by winter and monsoon.

INTRODUCTION

Algae are the most abundant autotrophic unicellular and multicellular group of plant. Bassilariophycean members commonly known as Diatoms. They are the autotrophic element of aquatic ecosystem each ecosystem. They are common unicellular symmetrical golden or brown green plants in fresh water, marian water and polluted water. Many researcher studies on fresh water Diatoms but no works has been done on waste water Diatoms particularly in cement industry. These industry is situated in MIDC area of Beed. Water pond is used for the manufacturing many cement products in the industry. In India few researchers were paid their attention on diatoms by Venkatraman (1939-1956). He gave systematic account of south Indian Diatoms Gonzalves (1947) was first reported diatoms in Maharashtra. Gonzalves & Gandhi (1952-1954), Gandhi (1955, 1956, 1960), Sarode & Kamat (1984), Talekar & Jadhav (2009). Hence we decided to work on Diatoms in cement industry waste water.

MATERIALS AND METHODS

Algal sample were collected to June 2016 to May 2017 in monthly intervals. Acid wash bottle are used for the collection and collected sample were preserved in 4% formalin. Fresh as well as preserved algal samples were observed under the microscope in laboratory. Identified with the standard literature Smith, 1950; Prescott, 1951; Kamat, 1962; Philipose, 1967). The water samples were collected in seasonal interval and analysis of TDS, Calcium, BOD and COB in laboratory. These samples was analyzed by the method of APHA, 21st Ed., 2005 and IS3025 (part 44) 1983. At the time of collection pH and Temperature were recorded.

RESULTS AND DISCUSSION

During investigation thirty six taxa from sixteen genera of diatoms were recorded from cement industry waste water. In present study sixteen genera of diatoms uiz *Cyclotella*, *Fragilaria*, *Synedra*, *Anomoconeis*, *Cocooneis*, *Achnanthes*, *Gyrosigma*, *Coloneis*, *Neidium*, *Navicula*, *Pinnularia*, *Amphora*, *Cymbella*,

Gomphonema, *Nitzschia* and *Surirella*. Seasonal variation study reveals dominance of Diatoms is in the month of summer followed by winter and monsoon. In the study period water temperature is ranged 28-31 degree Celsius and pH is in the range 8 to 11. Seasonal variation pH, Temperature and Alkalinity is in the month of summer followed by winter and monsoon the result were portended by Pahariya and Maviya (1988). Maximum Turbidity and BOD noted in monsoon season. Minimum TDS

(537 Mg/L) in winter and Maximum (676 Mg/L) in monsoon season. COD count maximum in the winter season followed by summer and monsoon. (Table 1, 2 and 3 Our work is similar to earlier workers (Blin, 1991; Gandh, 1955; 1956; 1958a; 1958b; Gonzalves, 1947; Gonzalves and Gandhi, 1952; Mahajan *et al.*, 2005; Nandan *et al.*, 2009; Sarode and Kamat, 1984; Sawdekar and Jadhav, 2017; Talekar and Jadhav, 2010; Venkatraman, 1939; 1956)

Table 1: Diatoms of cement industry Waste Water.

Sr.No.	Name of the Diatoms	Sr.No.	Name of the Diatoms
1	<i>Cyclotella glomerata</i>	19	<i>Navicula viridula</i>
2	<i>Cyclotella ocellata</i>	20	<i>Navicula exigua</i>
3	<i>Fragilaria capucina</i>	21	<i>Pinnularia brevicostata</i>
4	<i>Fragilaria vircsens</i> Ralf	22	<i>Pinnularia lundii</i>
5	<i>Fragilaria intermedia</i>	23	<i>Amphora ovalis</i>
6	<i>Fragilaria ungeriana</i>	24	<i>Cymbella aspera</i> (Her.)
7	<i>Synedra ulna</i>	25	<i>Cymbella bengalensis</i>
8	<i>Anomoconeis sculpta</i>	26	<i>Cymbella cistula</i> (Hemprich)
9	<i>Cocconeis placentula</i>	27	<i>Cymbella laevis</i> Naeg.
10	<i>Achnanthes brevipes</i>	28	<i>Cymbella Ventricosa</i> kuetz
11	<i>Gyrosigma acuminatum</i>	29	<i>Gomphonema abbreviatum</i>
12	<i>Gyrosigma bhusaualensis</i>	30	<i>Gomphonema lonceolatum</i> Ehr.
13	<i>Coloneis aequatorialis</i>	31	<i>Gomphonema longiceps</i> (Ehr.)
14	<i>Caloneis cleuei</i>	32	<i>Gomphonema ventricosum</i> Gregory
15	<i>Neidium amphigomphous</i>	33	<i>Nitzschia acuta</i> Hantzsch
16	<i>Neidium longiceps</i>	34	<i>Nitzschia closterium</i> W. Smith
17	<i>Navicula pupula</i>	35	<i>Nitzschia obtusa</i>
18	<i>Navicula tusculoides</i>	36	<i>Surirella subsalsa</i> W. Smith

Table 2: Seasonal variation of Diatoms in cement industry Waste Water

Monsoon		Winter		Summer	
Genus	Species	Genus	Species	Genus	Species
07	10	11	20	13	29

Table 3: Seasonal variation of Physico-chemical parameters in cement industry Waste Water

Sr.No.	Season / Parameters	Monsoon	Winter	Summer
1	Temperature	28 C	28 C	31 C
2	pH	08	09	11
3	Turbidity	15 NTU	12 NTU	12 NTU
4	Alkalinity	15 Mg/L	140 Mg/L	224 Mg/L
5	Calcium	02 Mg/L	14 Mg/L	06 Mg/L
6	TDS	676 Mg/L	537 Mg/L	622 Mg/L
7	BOD	13 Mg/L	11 Mg/L	11 Mg/L
8	COD	74 Mg/L	92 Mg/L	80 Mg/L

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