



## Assessment of Physico-Chemical parameters of Chulband dam in Gondia District. (MS), INDIA.

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### Abstract:

Assessment of physico-chemical parameters were carried out during throughout the year Feb-2010 to Jan-2011 from Chulband dam in Gondia District. The various parameters such as Temperature, Turbidity, Transparency, TDS, TSS, TS, pH, DO, BOD, CO<sub>2</sub>, Hardness, Calcium, Magnesium, Chloride and Phosphorous were analysed. The results revealed that there was significant variations in the physicochemical parameters and most of the parameters were in the normal range and indicated better quality of water. The results indicate that the Chulband dam water is non-polluted and can be suitable for drinking water, Domestic, Irrigation and Pisciculture.

**Keywords:** Physico-chemical water parameters, Chulband dam, Gondia district.

### Introduction

Water is a wonder of the nature. Water was useful to the people for drinking, cleaning, rearing animals and for agriculture, plantation etc. “ No life without water ” is a common saying depending upon the fact that water is the one of the naturally occurring essential requirement of all life supporting activities. Since it is a dynamic system, containing living as well as nonliving, organic, inorganic, soluble as well as insoluble substances. A recent world water development report ranked India 133<sup>rd</sup> among 180 countries in terms of water availability and 120<sup>th</sup> among 122 countries in terms of water quality. Water tankers supplying drinking water in many parts of the country by rail and road is a common sight. Women in villages suffer most as they have to walk more than 2 kms to fetch drinking water needs. Millions of households in urban areas wake up in the pre-dawn to fill water as the municipal supply is only for few minutes or hour in a day (Chawan, 2005). In India, clean drinking water is available to only 12% of the people. The rest have to use polluted sources of water, which causes diseases, health & hygiene problems (Trivedi,

2004). Urbanization found to be root cause of water contamination. Animals use same water for drinking and can also contaminate through direct defecation and urination. Immersion of idols during festivals found to be one of the reasons of river pollution (Kamal et al., 1999). Cherian and Shahare (2011) studied earlier on Pollution, a threat to conservation of biodiversity in fresh water body of Chulband River, Gondia dist., Maharashtra”. Shahare and Cherian (2012) worked on “Study of Cyanophycean diversity at Chulband Dam, Gondia Dist. (M.S.) India”. Chulband River makes its origin from various small and large streams scattered in the forest hilly areas of eastern part of Gondia district. It flows in the forest area for few kms and then enter in the Chulband dam which the present study was undertaken.

### Materials and Methods

Gondia (Latitude. 21° 28' N & Longitude. 80° 29' E) district is situated in the eastern part of Maharashtra state. The district covers an area of 4843.12 sq. km. of which 2644.70 sq. km. fall under forest area.

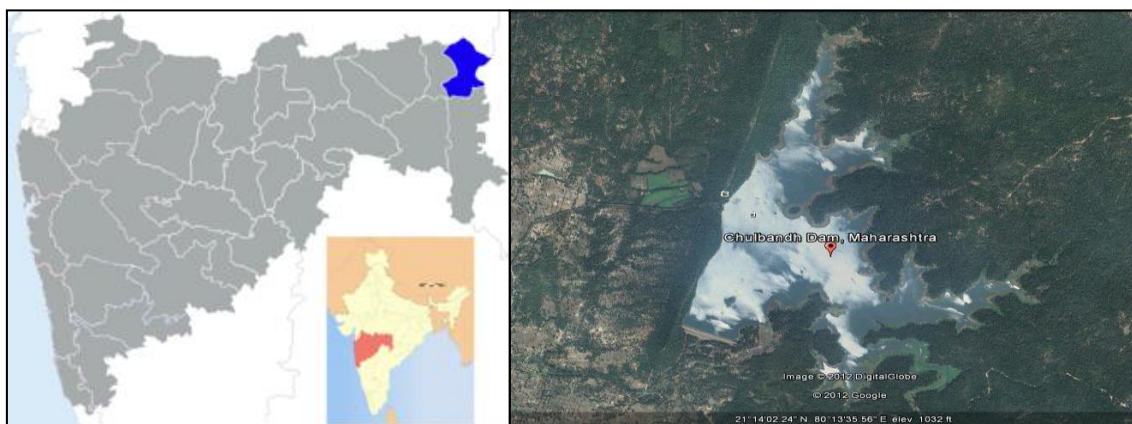


Fig.I Map Showing Chulband Dam, Gondia district. (MS.)

The source streams of the Chulband River originate from the Salegaon Dalli near Dodake-Jambhali and Palasgaon hill complex. The Chulband river flows southwards with a subparallel valley to that of the Wainganga to its east and joins it at the southern limits of the district near the village Soni. The river like Bagh, Chulband, Pangholi, Suz, Gadhavi, Chandan, Bavanthadi are the tributaries of river Wainganga. Thus Chulband River is the life line of Gondia district. The present investigation Chulband dam location is (Latitude. 21°14'05.14' N & Longitude. 80°13'12.11' E) and Fig. 1.

### Sampling and Analysis of Water

The water samples of the Chulband dam were collected at monthly intervals from the selected site on the each month, from Feb

Table no.1: Physico-chemical parameters of Chulband Dam, Gondia district.

Parameters	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Temperature	23	28	30	32	33	26	31	30	28	25	24	21
Turbidity	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Transparency	42.65	34.61	35.57	36.19	35.56	27.63	60.96	95.25	93.26	84.32	67.26	58.66
TDS	68	170	164	139	143	212	213	160	137	93	124	128
TSS	78	84	75	82	63	86	97	86	77	89	42	60
TS	146	254	239	221	206	298	310	246	214	182	166	188
pH	7.9	6.9	7.1	7.3	7.5	6.3	6.9	7.1	7.2	7.2	7.1	6.9
DO	6.1	7.2	7.3	6.1	7.6	4.5	6.9	5.1	4.5	6.3	7.7	5.9
BOD	3.4	2.2	3.9	3.7	4.4	6.5	7.9	5.6	5.3	5.8	5.2	5.7
CO <sub>2</sub>	3.9	5.6	5.8	5.9	4.2	5.2	5.8	3.9	3.2	3.1	3.5	3.2
Hardness	22.44	22.44	27.25	28.86	128.26	27.25	22.44	27.25	32.06	36.87	51.30	24.05
Calcium	10.42	9.62	9.62	4.81	14.43	12.02	9.62	12.02	12.83	13.63	21.64	8.02
Magnesium	12.02	12.83	17.64	24.05	113.83	15.23	12.83	15.23	19.24	23.25	29.66	16.03
Chloride	28.40	34.23	55.15	86.15	34.80	46.15	31.50	33.50	30.06	31.95	23.55	30.47
Phosphorus	1.3	1.7	1.2	0.9	1.1	1.1	1	1.1	1.2	1.1	0.7	1.2

\*Neg=Negligible

### Temperature:

In the present study water temperature was recorded between 21°C in to 33°C. It was maximum in the June month and minimum in the January month. The water temperature depends on geographical location and meteorological condition. Hutchinson (1957) suggested that meteorological conditions are responsible for seasonal changes in temperature. (Graph.1). Similar reports were observed by Kamble et al. (2009) in Ruti dam, Asthi.

**Turbidity:** The turbidity was recorded is negligible throughout the year (Table no.1). Turbidity was higher which was because of rains bringing the sediments from the adjoining areas and due to turbulent flow which stirred up the nonliving matter like silt and sand at the bottom of the water bodies during rainy seasons.

**Transparency:** Transparency values were ranged from 27.63 to 95.25 cm (Graph.2). The water transparency value was maximum in September month and minimum in July. Transparency is a physical variable significant

to primary production and also depends on the micro-organisms present in the water body and suspended organic and inorganic mater present in the water. Similar reports were observed by Kamble et al. (2009) in Ruti dam, Asthi.

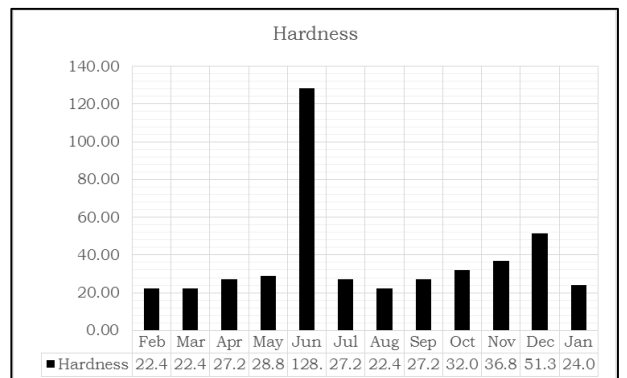
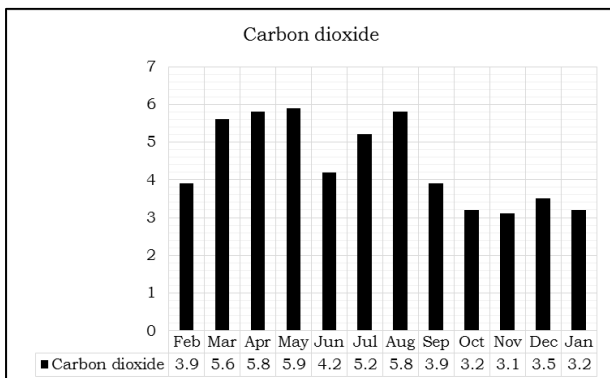
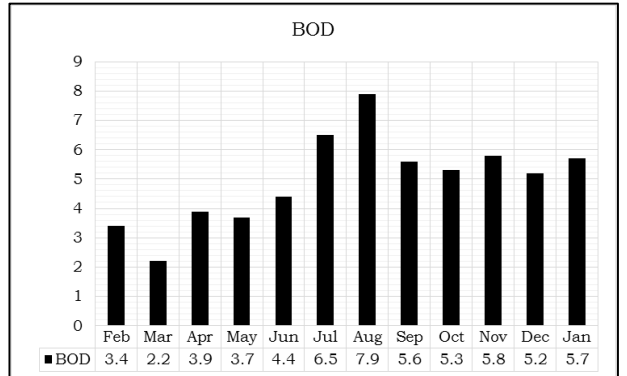
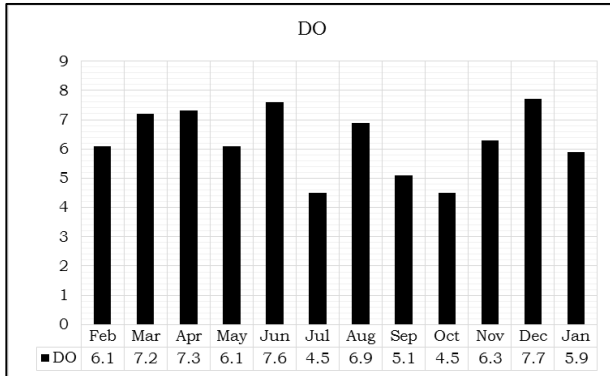
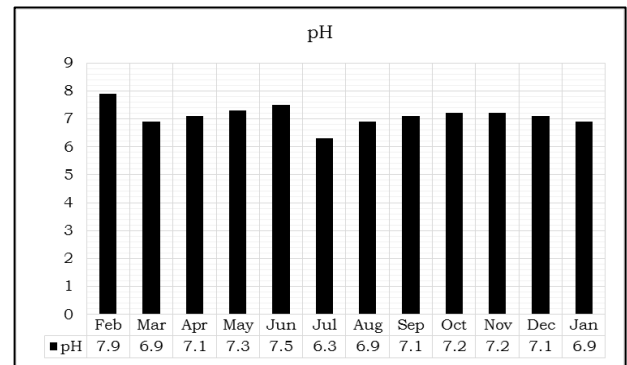
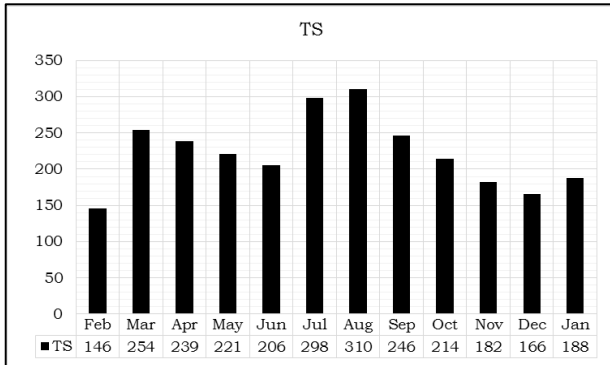
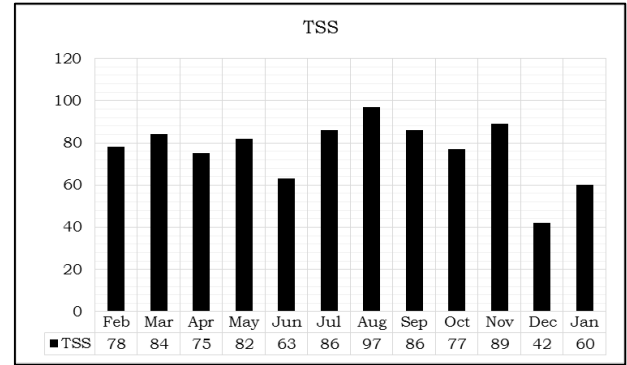
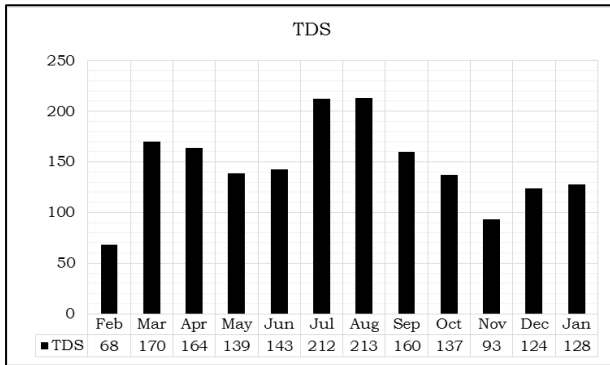
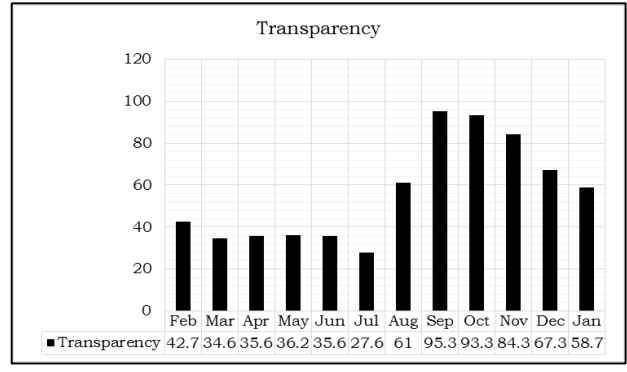
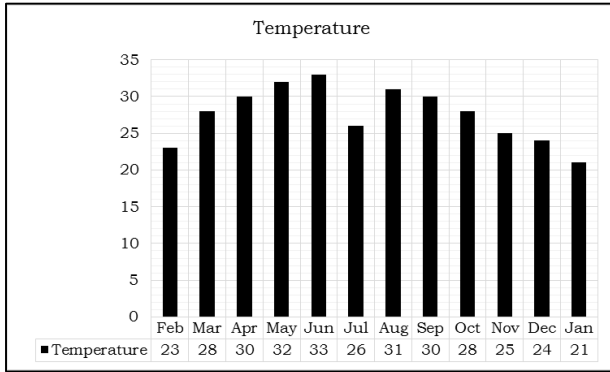
### Result and Discussion:

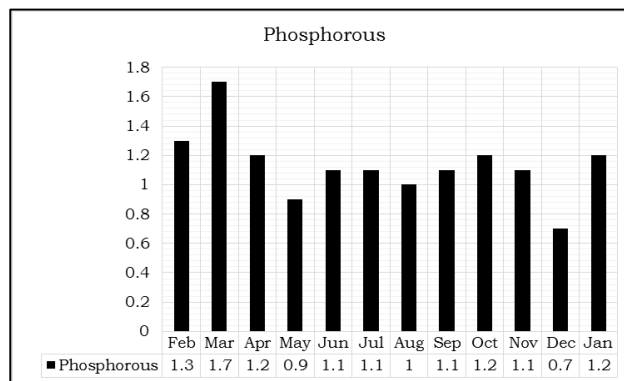
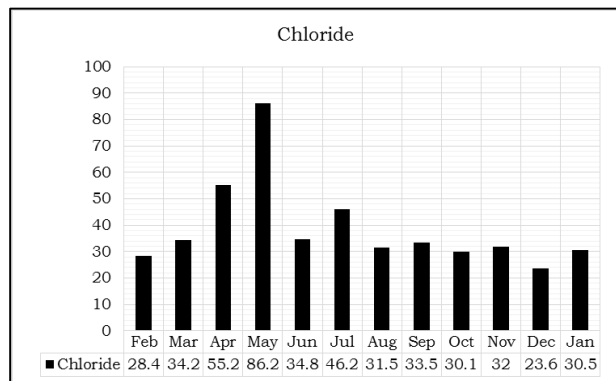
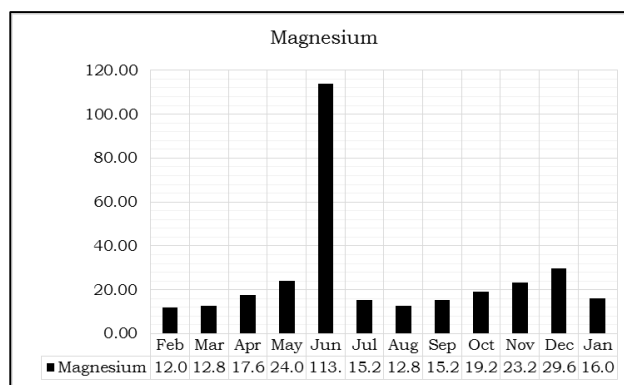
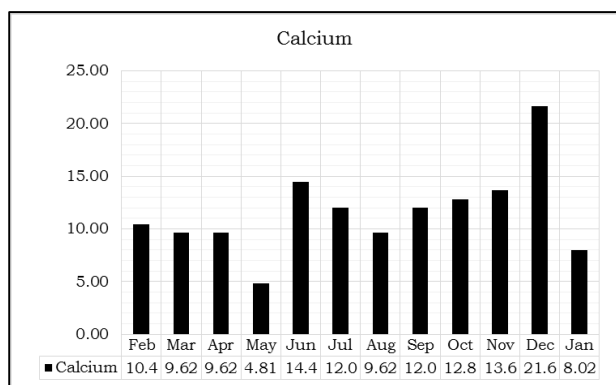
In the present investigation, considerable variation in physico-chemical parameters is presented in Table no.1

**TDS (Total Dissolved Solids):** The TDS value during the period of investigation was ranged between 68 mg/L in Feb 2010 and 213 mg/L in Aug 2010 (Graph.3). Mohmmad Musaddiq and Fokmare (2002) observed values of total suspended solids ranged within 45 to 152 mg/L. of surface water in Akola city.

**TSS (Total Suspended Solids):** Total Suspended Solids (TSS) of the water samples was minimum 42 mg/l in Dec and maximum 97 mg/l in the Aug month (Graph.4).

**TS (Total Solids):** TS ranged between 310 mg/l in the month of Aug 2010 and 146 mg/l in the month of Feb 2010. (Graph.5). TS of the water causes the reduction in light penetration, ecological balance and ultimately affects the water quality. It may affect the osmotic regulation of aquatic fauna.





**pH:** Present study revealed that pH of water ranged from 6.3 in July 2010 to 7.9 in Feb 2010 (Graph.6). Bobdey (2010) had recorded pH values between 7.0 to 8.50 in the river Wainganga at Pauni, Maharashtra.

**DO (Dissolved Oxygen):** DO in water bodies depends on various factors like climatic conditions, partial pressure of gases, dissolved salts, stream velocity, relative solubility, photosynthetic activity of plants, respiration by aquatic microbes, plants and animals (Zutshi and Vass, 1978). In the present investigation DO varied between 4.5 mg/L in months July and Oct 2010 and 7.7 mg/L in Dec 2010 (Graph.7). DO is most important factor of the water ecosystem, as it regulates the metabolic processes of the most organisms.

**BOD (Biochemical Oxygen Demand):** In the present research BOD was ranged between 2.2 mg/L in March 2010 and 7.9 mg/L in Aug 2010 (Graph.8). BOD has been used as measure of the amount of organic material in an aquatic solution which support the growth of micro-organisms.

**CO<sub>2</sub> (Carbon Dioxide):** The CO<sub>2</sub> level mostly governs by the available algae as well as diffusion through atmospheric air. The CO<sub>2</sub> of the water sample varied between 3.1 mg/l in Nov. month and 5.9 mg/l in the month of May. (Graph.9). Similar reports were observed by Kamble et al. (2009) in Ruti dam, Asthi.

**Hardness:** Hardness was found to fluctuate between 22.44 mg/l in the month of Feb, March and Aug. 2010 and 128.26 mg/l in the month of Dec. (Graph.10).

**Calcium:** Present study revealed that Calcium of water ranged from 4.81 mg/l in May 2010 to 21.64 mg/l in Dec 2010 (Graph.11). The presence of calcium in the water is more likely in the form of carbonate, which is also indicated by high values of hardness in water samples.

**Magnesium:** The Magnesium of the water sample varied between 12.02 mg/l in the Aug month and 113.83 mg/l in the month of June. (Graph.12). Magnesium is an essential element for all living organisms as it takes part in chlorophyll biosynthesis and enzymatic transformation (Weztel, 1975).

**Chloride:** The Chloride of the water sample varied between 23.55 mg/l in the month of Dec 2010 and 86.15 mg/l in the month of May. (Graph.13). the chloride concentration serves as an indicator of pollution by sewage. People accustomed to higher chloride in water are subjected to laxative effects (Dahiya and Kaur, 1999).

**Phosphorus:** Phosphorus is the essential elements for increase in productivity of biological produce (Hutchinson, 1957). The Phosphorus of the water sample varied between 0.7 mg/l in the month of Dec 2010 and 1.7 mg/l in the month of March. (Graph.14).

### Conclusion:

During study, water sample from of Chulband dam, Gondia district (M.S) were collected for the period of 12 months (Feb 2010 to Jan 2011) and analysis of various physico-chemical parameters had been carried out. The results revealed that there was significant variations in the physicochemical parameters and most of the parameters were within the permissible limit and indicated better quality of river water. The results indicate that the Chulband dam, water is non-polluted and can be used for Domestic, Irrigation and Pisciculture and the quality of water is good and it is fit for drinking purpose.

### References:

- APHA** Standard Methods for the Examination of Water and Waste Water: 20th Edn., Washington D.C., U.S.A. (1998).
- Bobdey, A. D., Puranik, P. G., Sawane, A. P., Dhande, R. S. and Bhagat, V. B.;** Assessment of water quality in the vicinity of Municipal water pumping station, of river Wainganga at Pauni, District-Bhandara (Maharashtra). Bioscience Biotechnology Research Communications. Vol. (3) No. (1), 90-93. (2010).
- Chawan, S. V.;** Water Resource of India. National Level Conference on Water Management Scenario 2025 Problems, Issues and Challenges. 12-22. (2005).
- Cherian K.J. and Shahare P.C;** "Pollution, a threat to conservation of biodiversity in fresh water body of Chulband river, Gondia dist., Maharashtra" Essence, Volume II No. 2 [70 78]. (2011).
- Hutchinson, G.E;** A treatise on limnology, Vol. 1 Geography, Physics and Chemistry. John Willey and Sons, Inc. New York 1015. (1957).
- IAAB** (Indian Association of Aquatic Biologists) manual. (2006).
- Kamal MM, Malmgren-Hansen A and Badruzzaman, AB;** Assessment of pollution of the River Buriganga, Bangladesh, using a water quality model. Water. Sci. Technol. 40(2):129-136. (1999).
- Kamble S.M., Kamble A.H. and Narke S.Y;** Study of Physio-chemical parameters of Ruti dam, Tq. Asthi, Dist. Beed, Maharashtra. J. of Aquatic Biology, Vol. 24(2), pp.86-89. (2009).
- Mohammad Musaddiq and Anil K. Fokmare;** Determination of water quality index of surface water source of Akola city (MS.), J. of Aquatic Biology, Vol. 18(2), pp.27-31. (2002).
- Shahare P.C. and Cherian K.J.:** "Study of Cyanophycean diversity at Chulband Dam, Gondia Dist. (M.S.), India." Bionano Frontier, Special Issue-9 (128-130). (2012).
- Sudhir Dahiya and Amarjeet Kaur;** physico-chemical characteristics of underground water in rural areas of Tosham subdivisions, Bhiwani district, Haryana, *J. Environ Poll.*, 6 (4), 281 (1999).
- Trivedi, P.R.;** India's Environment, APH Publishing Company, New Delhi. (2004).
- Weztel, R. G;** Primary production river ecology. Blackwell Scientific Publication, Oxford, (1975).
- Zutshi, D. P., and Vass, K. K.;** Limnological studies on Dal Lake. Chemical features. Indian J. Ecol. 5, 90-97. (1978).