

Seasonal periodicity and pollution level of Mahasethi reservoir of district Madhubani, Bihar

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ABSTRACT

The physico-chemical characteristics of the aqueous phase influence on the types and distribution of aquatic biota. Normally, water is never pure in chemical sense and there are natural impurities derived from at wasp hare catchments areas and the soil. Thus, the importance of water quality is quite obvious.

As the part of thesis work, in the present study, an attempt has been made to investigate the water quality in terms of seasonal periodicity and pollution level of fish culture Mahasethi reservoir located in Madhubani district of Bihar.

Keywords: *Aquatic biota, Mahasethi reservoir, Ecological status.*

INTRODUCTION

A reservoir usually means an enlarged natural or artificial lake, storage pond or impoundment created using dam or lock to store water. It can be created by controlling a stream that drains an existing body of water. People have been creating reservoirs for thousand of years and used as fish culture too.

Madhubani district of Bihar is known as the richest fish production district of Mithilanchal region which is also well identified as culture of makhana and Singhara in a number of reservoirs in urban and rural areas.

Water quality statuses of reservoirs are generally analyzed to determine the pollutional load of these water bodies. In order to utilize fresh water bodies successfully for fish production, it is exceedingly important to study the physico-chemical parameters that influence the productivity of water bodies(Athokpam *et al.*, 2015; Rajesh *et al.*, 2011; Rai , 2012; Mandal *et al.*, 2012; Choudhary *et al.*, 2014; Azmi *et al.*, 2015 and Bopinwar *et al.*, 2016). Therefore a regular monitoring is the need of these reservoirs. In the present study, the various physico-chemical analysis of Mahasethi reservoir of district Madhubani have been undertaken.

MATERIALS AND METHODS

Samples of selected Mahasethi reservoir of district Madhubani from different sites were collected for a period of twelve months, starting from February 2014 to January 2015. 125ml glass bottles were used to collect and fix samples for estimation of dissolved oxygen (DO) content. Samples were collected in triplicate from each site during the four quarters of the year using PET bottles as per standard procedures. The samples thus collected were analysed for the work plan of physico-chemical parameters employing standard methods (APHA, 2005).

RESULTS AND DISCUSSION

Four seasons were studied as post monsoon, summer, pre-monsoon and monsoon. The data presented here are discussed on the basis of these seasons. The results of physico-chemical analysis of the studied Mahasethi reservoir of district Madhubani are shown in Table 1. During the preliminary study of my PhD thesis work it was found higher temperature in summer, lower in winter and medium in rainy season.

Table 1

Physico-chemical profiles of studied Mahasethi reservoir of district Madhubani (From February 2014 to January 2015)

Parameters	Summer Season				Rainy Season				Winter season			
	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
At ($^{\circ}$ C)	21.6	25.0	29.4	34.5	34.2	28.5	28.0	26.2	26.0	21.1	17.9	17.3
Wt($^{\circ}$ C)	18.2	23.8	25.0	27.7	27.8	26.4	24.0	24.5	21.2	21.0	20.4	16.1
TR	25.0	27.1	30.3	35.2	32.0	28.1	22.8	15.0	17.2	20.4	19.5	21.6
P^H	8.2	8.1	8.2	8.5	8.6	8.0	7.2	7.0	7.3	7.5	7.6	7.7
TDS (ppm)	50	460	580	640	790	920	705	630	400	430	550	545
DO ₂ (ppm)	11.4	8.6	5.8	3.7	6.1	7.0	7.5	8.0	9.2	10.0	12.0	13.9
FCO ₂ (ppm)	7.3	5.40	4.20	4.03	4.60	6.70	6.12	4.7	3.70	4.13	2.85	6.0
Ca (ppm)	34.2	35.8	40.0	45.2	45.0	42.2	30.0	26.4	26.5	25.3	28.0	31.8
Mg (ppm)	12.4	14.2	20.3	20.5	23.9	17.4	6.2	3.6	7.0	8.8	10.4	10.0
Cl (ppm)	41.0	50.2	62.1	65.2	70.0	78.2	76.0	59.8	54.9	50.7	45.2	42.5

At = Atmosphere temperature, **Wt** = Water temperature, **T_R** = Transparency, **P^H** = Hydrogen ion concentration, **TDS** = Total Dissolved Oxygen, **DO₂** = Dissolved Oxygen, **FCO₂**= Free Carbon dioxide, **Ca**=Calcium, **Mg**=Magnesium, **Cl**=Chlorine.

The range was between 17.3-34.5 (January – May). It has been observed that an indirect effect to toxicity intensifying deoxygenating and finally increasing the biomagnifications, that is why the dissolved oxygen depletion and plankton are characterized by cyanobacterial algal blooms (Khare, 2002 and Jha, *et al.*, 2004, 2006). The nature and health of aquatic communities is an expression of water (APHA, 2005). Water pollution manifests through changes such as physical, chemical and biological parameters. The studied reservoir was observed alkaline throughout the study period (pH 7.0-8.6 *i.e.* September-June). The alkalinity was lower in the month of September, higher in summer and winter seasons. The observation showed that the studied reservoir did not have trend of normal reservoir. This may be due to flood affected area of the region time to time. However, the eutrophication trends with normal and developing as polluted reservoir has been studied by some works (Jha, *et al.*, 2006 and Dwiwedi and Pandey, 2001).

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