



ORIGINAL ARTICLE

Water Analysis of Physico-Chemical Parameters from Sajnam Dam/Reservoir District Lalitpur (U.P.) India

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ABSTRACT

The present study deals with the analysis of physico-chemical parameters of Sajnam Dam/Reservoir district Lalitpur (U.P.) during August 2013 to July 2014. Monthly variation in physical and chemical parameters such as water temperature, turbidity, total dissolved solids, pH, free CO₂, dissolved oxygen, hardness, alkalinity, chlorides, and phosphate were recorded and only minor differences in parameters of study area were observed. The result indicates that the dam is non-polluted and can be used for domestic, irrigation and fisheries purpose.

Keywords: Physico-chemical parameters, Sajnam Dam/Reservoir, Lalitpur

INTRODUCTION

Dam/Reservoir is the oldest and significant source of irrigation in Lalitpur (U.P.) India. Dam/Reservoir occupies vital role in irrigation as well as local ecosystem in semi arid region of U.P. east. Dam/Reservoir provide multiple uses like source of drinking water for uncountable rural and urban communities, livestock, fish culture, recharge of ground water and control of floods (Gurunathan and Shanmugam, 2006). A number of authors have studied the physical and chemical characteristics of some Indian water bodies Viz. Verma (2004) ; Koli and Ranga, 2011; Gupta *et.al.*, 2011; Kulkarni and Tapase, 2012; Khan *et.al.*, 2012; Naik *et. al.*, 2012. Sajnam Dam/Reservoir situated at 32km away from Lalitpur city in Bundelkhand region of (U.P.) India. It is constructed during 1977-1990 on Sajnam River. The pointable features of the dam are 4525m in length, 13m in height, 290sq km area and 83.50M.cm storage capacity, coordinates, 24°29' 28"N 78°34'56"E.

MATERIAL AND METHODS

The water samples from Sajnam dam collected in the morning hours between 9 to 12 am in polythene bottle regularly for every month. The water samples were immediately brought in to laboratory for analysis of various physico-chemical parameters like such as DO, TDS, free CO₂, hardness, alkalinity, chloride and phosphate while other parameters like water temperature and pH were recorded at the time of sample collection by using thermometer and Pocket size digital pH meter. The samples for different parameters were analysed with the help of procedures described by APHA (1985), Trivedy and Goel (1986), Kodarkar (1992).

RESULTS AND DISCUSSION

(a) Water Temperature:

Generally, the weather in study area is quite cool; the maximum temperature of 25°C was recorded in May and June while minimum of 15°C was recorded in month of November. Water temperature in summer was high due to low water level, high temperature and clear atmosphere (Salve and Hiware, 2008).

(b) Turbidity:

The turbidity of water fluctuates from 3.88 NTU to 18.30 NTU. The maximum value of 18.30 NTU was recorded in the month of July, it may be due to human activities and presence of suspended particulate matter while minimum value of 3.88 NTU in the month of October.

(c) Total Dissolved Solids:

The total dissolved solids fluctuate from 117mg/l to 235 mg/l. The maximum value (235 mg/l) was recorded in the month of June; it is due to heavy rainfall and minimum value (117 mg/l) in the month of May.

(d) pH:

pH was alkaline values ranges from 7.05 to 8.40. The maximum pH value (8.40) was recorded in the month of November and minimum (7.05) in the month of April . Most of bio-chemical and chemical reactions are influenced by the pH. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH, the low oxygen values coincided with high temperature during the summer months (Kamble, S. M. *et. al.*, 2009). The factors like temperature bring about changes the pH of water. The higher pH values observed suggests that carbon dioxide, carbonate-bicarbonate equilibrium is affected more due to change in physico-chemical condition (Trivedi *et. al.*, 2009).

(e) Free Carbon dioxide:

The value of free CO₂ ranges from 3.6 mg/l to 13.8 mg/l. The maximum value (13.8 mg/l) was recorded in the month of June and minimum value (3.6 mg/l) in the month of November. The value of CO₂ was high in June; this could be related to the high rate of decomposition in the warmer months.

(f) Dissolved Oxygen:

The value of DO fluctuates from 5.0 mg/l to 10.9mg/l. The maximum values (10.9 mg/l) was recorded in the month of November and minimum values (5.0 mg/l) in the month of August, December and January.

(g) Hardness:

The value of hardness fluctuates from 67 mg/l to 195 mg/l. The maximum value (195 mg/l) was recorded in the month of June and minimum value (67 mg/l) in the month of October. Hujare, M. S. (2008) also reported, the total hardness was high during summer than monsoon and winter. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of evaporation of water.

Table 1: Physical parameters of Sajnam Dam District Lalitpur (U.P.) India

Month/year	Temperature in°C	Turbidity	TDS mg/l	pH
Aug.-2013	22.5	6.10	120.0	7.50
Sep.-2013	23.7	12.50	130.0	7.24
Oct.-2013	18.5	3.88	165.0	7.40
Nov.-2013	15	4.11	124.0	8.40
Dec.-2013	20	10.88	168.3	8.01
Jan.-2014	20.4	10.25	210.0	8.00
Feb.-2014	22	11.61	215.1	7.22
Mar.-2014	21.6	12.80	138.0	7.50
Apr.-2014	24	8.50	156.0	7.05
May-2014	25	8.00	117.0	7.80
Jun.-2014	25	11.50	235.0	7.50
Jul.-2014	24	18.30	225.0	8.06

(h)Alkalinity:

Total alkalinity ranges from 96 mg/l to 170 mg/l. The maximum value (170 mg/l) was recorded in the month of June and July while minimum value (96 mg/l) in the month of November (winter). The alkalinity was maximum due to increase in bicarbonates in the water. Hujare, M.S.(2008) also

reported similar result that it was maximum in summer and minimum in winter due to high photosynthetic rate.

Graph A: Physical parameters of Sajnam Dam District Lalitpur (U.P.) India

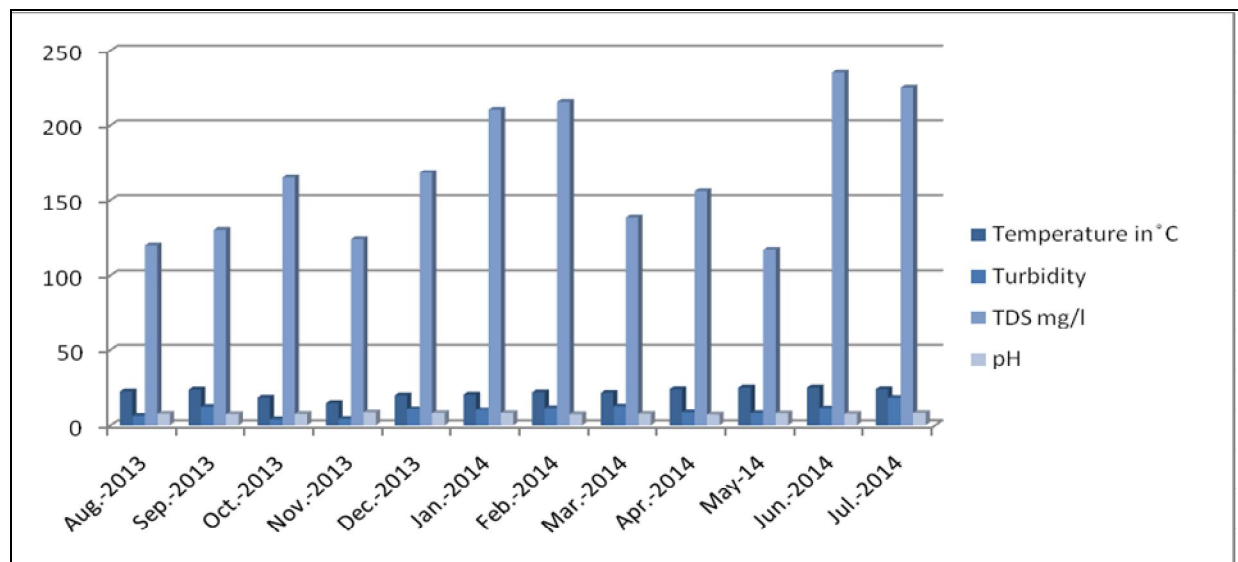
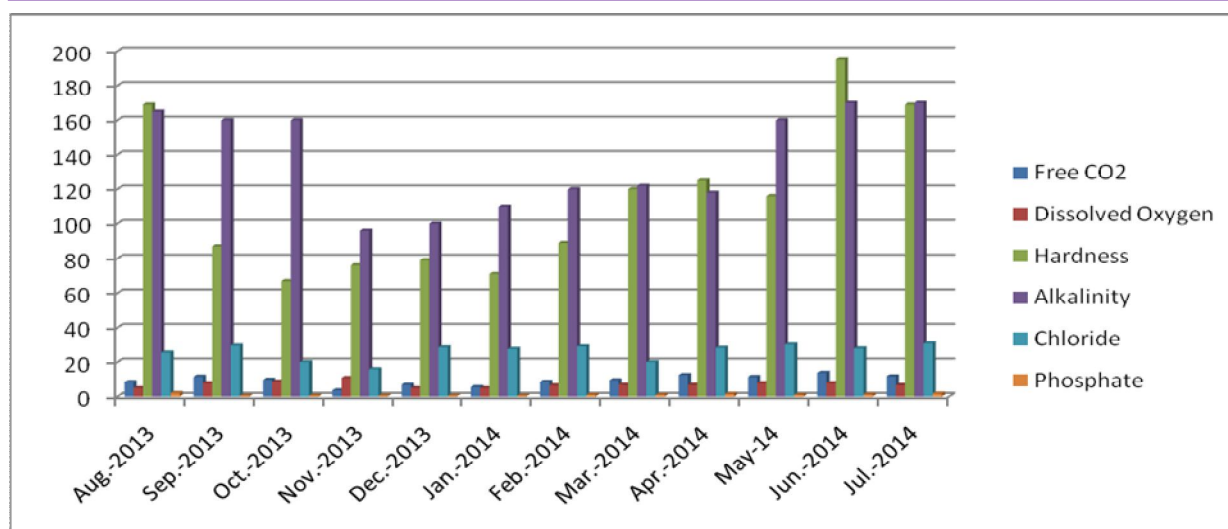


Table 2: Chemical parameters of Sajnam Dam district Lalitpur (U.P.) India

Month/Year	Free CO ₂	Dissolved Oxygen	Hardness	Alkalinity	Chloride	Phosphate
Aug-2013	8.4	5.0	169.0	165.0	25.5	2.01
Sep-2013	11.6	7.8	87.0	160.0	29.5	0.51
Oct-2013	9.8	8.8	67.0	160.0	20.0	0.51
Nov-2013	3.6	10.9	76.0	96.0	16.0	0.5
Dec-2013	6.8	5.0	79.0	100.0	28.5	0.5
Jan-2014	5.6	5.0	71.0	110.0	27.5	0.5
Feb-2014	8.6	6.5	89.0	120.0	29.0	1.01
Mar-2014	9.5	6.9	120.0	122.0	20.0	1.01
Apr-2014	12.6	6.8	125.0	118.0	28.2	1.55
May-2014	11.5	7.8	116.0	160.0	30.1	1.00
Jun-2014	13.8	7.8	195.0	170.0	27.9	1.24
Jul-2014	11.8	6.7	169.0	170.0	30.8	1.80

Graph B: Chemical parameters of Sajnam Dam district Lalitpur (U.P.) India



(i) Chloride:

The values of chloride ranges from 16 mg/l to 30.8 mg/l. The maximum value (30.8 mg/l) was recorded in the month of July and minimum value (16 mg/l) in the month of November. Similar result also reported by Swarnalatha and Narsingrao (1998).

(j) Phosphate:

The value of phosphate fluctuates from 0.5 mg/l to 2.01 mg/l. The maximum value (2.01 mg/l) was recorded in the month of August and minimum value (0.5 mg/l) in the month of November, December and January. The high value of phosphate in August month mainly due to rain, surface water runoff, agriculture run off and washer man activity could have also contributed to the inorganic phosphate content.

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