ISSN:0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 8(C), pp. 28451-28455, August, 2018

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

ResearchArticle

TO STUDY THE PHYSICO-CHEMICAL PARAMETERS OF NANDURMADHMESHWAR DAM, NASHIK DISTRICT, MAHARASHTRA, INDIA

PatilR. B*

Department of Zoology, A.C.S. College, Lasalgaon, Tal- Niphad, Dist- Nasik (M.S.) India

DOI: http://dx.doi.org/10.24327/ijrsr.2018.0908.2462

ARTICLE INFO

Article History:

Received 13thMay, 2018
Received in revised form 11th June, 2018
Accepted 8thJuly, 2018
Published online 28th August, 2018

Key Words:

Physico-chemical parameters, Nandurmadhmeshwar Dam and pollution

ABSTRACT

The present investigations reveal the physico-chemical parameters of Nandurmadhmeshwar Dam were monitored over a period of one year from June 2007 to May 2008. The water of the Nandurmadhmeshwar Dam is mainly used for Agricultural and drinking purposes. Different papameters such as Rainfall, Atmospheric Temperature, Water Temperature, pH, Dissolved Oxygen, Dissolved Carbon Dioxide, Calcium, Magnesium, Sulphates, Chlorides and Phosphates were studied and these suggests that the water is not polluted.

INTRODUCTION

Water is one of the most important and abundant compounds of the ecosystem. On the earth all living organisms need water for their survival and growth. 70% surface of earth is covered by water. Majority of water available on the earth is saline in the nature only 3 % of exists as fresh water. Fresh water has become a scare commodity due to over exploitation and pollution [1, 2, 3 and 4]

Water pollution is an acute problem in all the major rivers and dams in India. Water is known to contain a large numbers of chemical elements [5]. Most important source of water pollution and of great concern is the human activities. Even today open defecation in the fields and along the drains is common in India. These sewage drainages ultimately join water resources, make the water pollute and useless for drinking. Thus causing water-born diseases like diarrhea, dysentery, typhoid, fever intestinal helminthes, jaundice, cholera etc., that is endemic to India [6].

The quality of water is described by its physical, chemical and microbial characteristics. The present study aimed at assessing the water quality of Nandurmadhmeshwar dam used for irrigation, livestock watering and fish production using some selected physico-chemical parameters. The results will form the baseline for monitoring and tracking changes in the water quality as a result of the dam's natural dynamics over time and impact of main activities on the dam and its watershed.

MATERIALS AND METHODS

The study was conducted from the samples collected from the Nandurmadhmeshwar Dam of Nasik. The Nandurmadhmeshwar Dam is situated 20° 01′ North latitude and 74° 07′ East longitude. It has an area of 4219 sq. km. (1648 sq. miles) (Figure-1). The people of Nashik and Ahmednagar district in the past were facing continuous scarcity of water to overcome this situation the British government has constructed the Nandurmadhmeshwar Dam a confluence of river Godavari. The construction of the project was started in 1907 and completed in 1913.

In one year of study period June 2007 to May 2008, rainfall data was collected from the Tahsil office Tq. Niphad. Atmospheric temperature (AT) was recorded with the help of mercury thermometer. The water temperature, Dissolved Oxygen (DO), pH, and dissolved carbon dioxide were recorded by using portable water analysis kit.

These parameters were analyzed on the spot at selected stations A and B, soon after collecting the samples at fixed date and during 6 am to 8 am. The distance between A & B spots is approximately one and half km. The estimation of total calcium, magnesium, sulphates, chlorides and Phosphates were

Corresponding author:*Patil R. B*
Department of Zoology, A.C.S. College, Lasalgaon, Tal- Niphad, Dist- Nasik (M.S.) India

analyzed in the laboratory immediately after collecting samples. Parameters were measured in the laboratory by applying methods of [7].

RESULTS AND DISCUSSION

The physico-chemical papameters such as Rainfall, Atmospheric Temperature, Water Temperature, pH, Dissolved Oxygen, Dissolved Carbon Dioxide, Calcium, Magnesium, Sulphates, Chlorides and Phosphates were analysed taken from stations A and B of Nandurmadhmeshwar Dam of Nasik. All parameters were discussed seasonally and its variations across the months are graphically presented in Figures 2-12.

Figure 1 Selected sites for the study of Physico-Chemical parameters

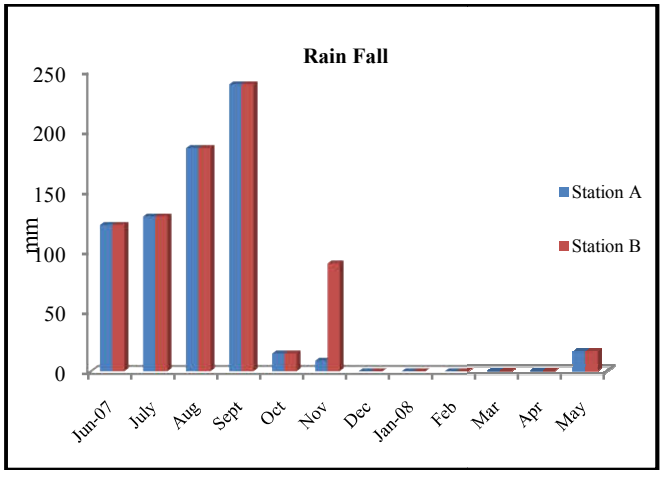

Figure-2

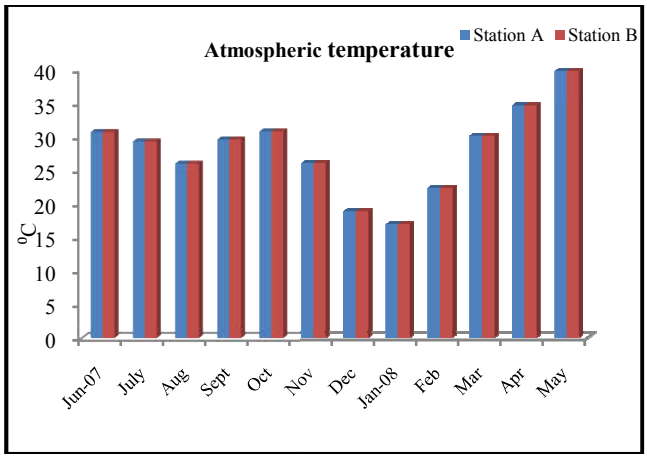

Figure-3

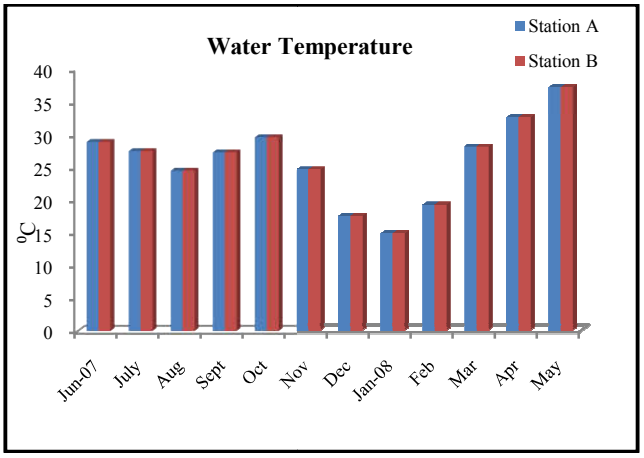

Figure-4

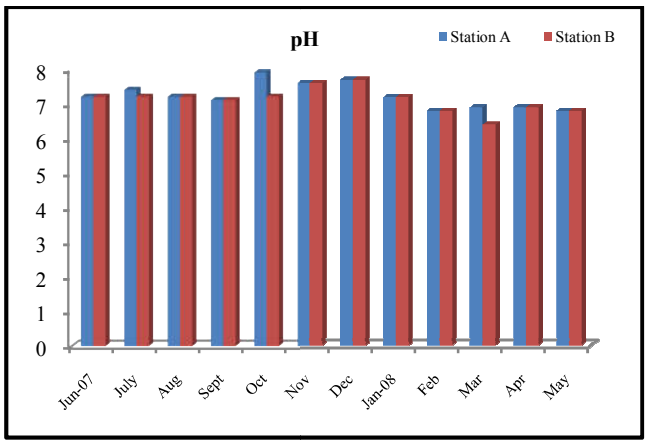

Figure-5

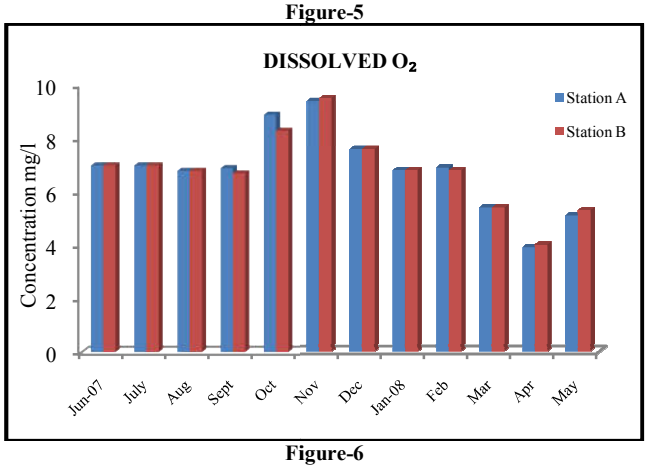

Figure-6

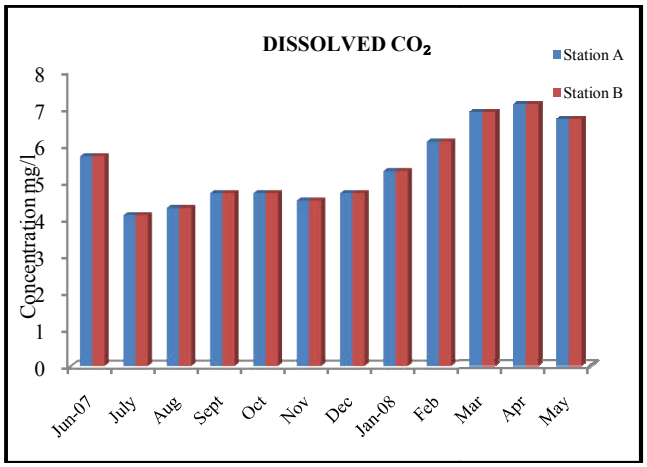

Figure-7

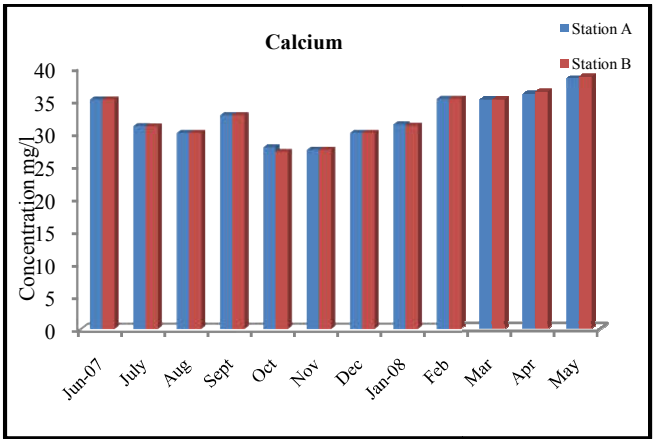

Figure-8

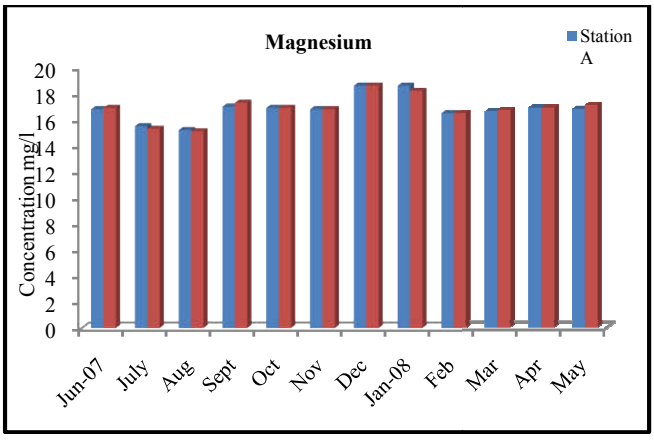

Figure-9

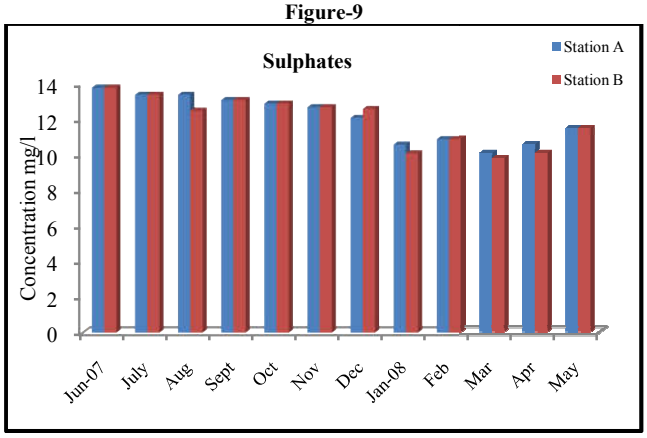

Figure-10

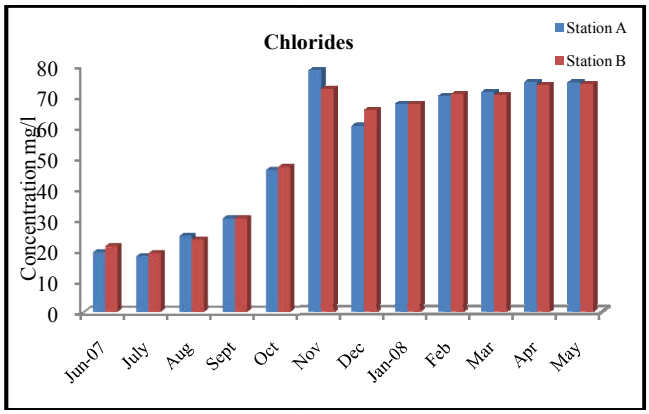

Figure-11

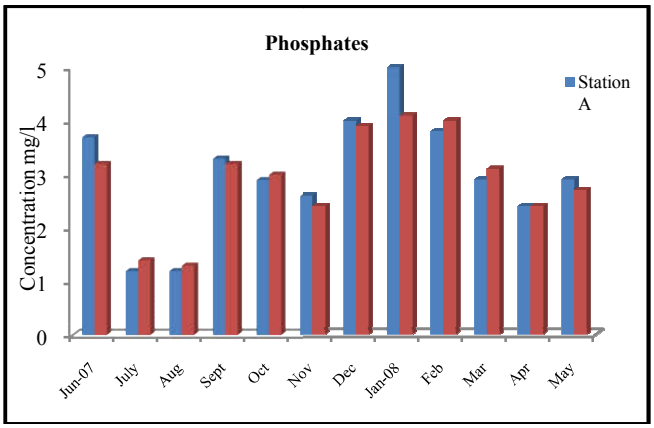

Figure-12

Rainfall

In the present study, the annual rainfall recorded 716 mm. The annual range of rainfall was 00 mm to 239 mm. The seasonal observations of rainfall showed highest in monsoon in the month of September and lowest in the months of summer (Figure 2).

Atmospheric Temperature

The atmospheric temperature was almost similar at both the sampling stations, although a slight variation was seen since the stations were located at distance away (one & half Km.) from each other. The atmospheric temperature ranged between 16.9ºC to 39.7ºC at station A and at station B. Similar trend was observed with little fluctuations. In the month of May the temperature observed highest 39.7ºC and lowest in the month of January 16.9ºC at station A and station B.

The atmospheric temperature in monsoon ranged between 26.0ºC to 30.7ºC, during winter it ranged between 16.9ºC to 30.8ºC and in summer it ranged between 22.3ºC to 39.7ºC at station A. Similar values of atmospheric temperature were recorded at station B (Figure 3).

Water Temperature

Water temperature was almost similar at both the sampling stations; the temperature range was almost less by one or two ºC than the atmospheric temperature observed. The Water temperature ranged between 14.8ºC to 37.2ºC. Similar observations were found in Ganga river basin [8].

The seasonal observations showed marked variations in water temperature. In monsoon water temperature ranges between

24.5ºC to 28.9ºC, in winter 14.8ºC to 29.6ºC and in summer 19.2ºC to 37.2ºC. The range observed at station B was very much similar in monthly as well seasonally. The highest was recorded in the month of May 37.2ºC while lowest in the month of January 14.8ºC (Figure 4).

Hydrogen Ion Concentration (pH)

In the present study the annual range of pH varied from 6.8 to 7.9 and 6.4 to 7.7 for the stations A and B respectively. The pH recorded 7.9 in the month of October at station A and 7.7 in December at station B were highest and lowest found in summer 6.8 and 6.4 at station A and station B respectively (Figure 5). The variation can be due to exposure of dam water to the atmosphere, biological activities and temperature changes [9].

Dissolved Oxygen

Dissolved oxygen recorded at Station A and Station B varied from 3.9 mg/l to 9.4 mg/l and 4.0 mg/l to 9.5 mg/l respectively. The month wise analysis at station A Dissolved oxygen recorded highest in the month of November 9.4 mg/l and lowest 3.9 mg/l in the April. At station B lowest concentration was observed in the month of April 4.0 mg/l while the highest was recorded 9.5 mg/l in the month of November (Figure 6). These observations were agreed with the finding of Dah Lake and Bendusara Project dist. Beed [10 and 11].

Dissolved Carbon Dioxide

The Carbon Dioxide varied from 4.1 mg/l to 7.1 mg/l and 4.1 mg/l to 7.1 mg/l at station A and B respectively. The lowest was recorded 4.1 mg/l in July and highest in April 7.1 mg/l at station A and Station B (Figure 7).

Calcium

In the present investigation, the annual range of calcium observed 27.4 mg/l to 38.3 mg/l and 27.1 mg/l to 38.6 mg/l at station A and B respectively. The seasonal analysis showed that at Station A the calcium ranged between 30.0 mg/l to 35.1 mg/l in monsoon, 27.4 mg/l to 31.3 mg/l in winter and 35.1 mg/l to 38.3mg/l in summer. At Station B calcium level was maximum in the month of May of summer 38.6mg/l and minimum in the month of October of winter 27.1 mg/l (Figure 8).

The values observed for both the stations were much closer and the range was narrow in monsoon and wide in winter followed by summer. The range of calcium observed during the present study was similar to that of calcium in freshwater bodies [12 and 13].

Magnesium

The annual range of Magnesium at station A was ranged between 15.2mg/l to 18.6 mg/l and at station B the range observed 15.1 mg/l to 18.6 mg/l. At Station A magnesium level was maximum in the month of January 18.6mg/l and minimum in the month of August 15.2 mg/l while at Station B magnesium level was maximum in the month of December 18.6 mg/l and minimum in the month of August 15.1 mg/l (Figure 9). Maximum level of hardness during post winter [14] and maximum magnesium hardness during the summer and winter seasons [15 and 16].

Sulphates

The annual range of sulphates in the water recorded at station A was 10.1 mg/l to 13.8 mg/l and at Station B 9.8 mg/l to 13.8 mg/l (Figure 10).Seasonal studies showed that sulphate content in sample water found to be highest in monsoon and lowest in summer at both the stations. Similarly, monsoon months showed the maximum values indicating that this nutrient brought in from allocanthonous source, low value may be attributed to its utilization by the mactrophytes for their growth [17].

Chlorides

The annual range of Chlorides of water samples collected at Station A was in between 18.2 mg/l to 78.3 mg/l and at Station B was found to be 19.2 mg/l to 73.9 mg/l. Seasonal observations showed that Chlorides ranged between 18.2 mg/l to 30.5 mg/l in monsoon, 46.2mg/l to 78.3 mg/l in winter and 70.0 mg/l to 74.5mg/l in summer at station A. For Station B Chlorides ranged between 19.2mg/l to 30.5 mg/l during monsoon, 47.2 mg/l to 72.3 mg/l in winter and 70.2 mg/l to 73.9 mg/l in summer (Figure 11). Similar results were foun in some Indian ponds [18, 19, 20 and 21].

Phosphates

The annual range of phosphates in the water samples collected at station A recorded 1.2 mg/l to 5.0 mg/l and 1.3 mg/l to 4.1 mg/l at station B. Seasonal studies showed that at station A phosphates ranged between 1.2 mg/l to 3.7 mg/l in monsoon, 2.6 mg/l to 5.0 mg/l in winter and 2.4 mg/l to 3.8 mg/l in summer. For station B phosphates ranged between 1.3 mg/l to 3.2 mg/l in monsoon, 2.4 mg/l to 4.1 mg/l in winter and 2.4 mg/l to 4.0 mg/l in summer (Figure 12). Similar results found in Kallar River [22].

CONCLUSIONS

The study of water samples from Nandurmadhmeshwar Dam reveals that the values for Physico-Chemical parameters were below the permissible limit given by the W.H.O. Hence the water of Nandurmadhmeshwar Dam is fit for consumption by humans.

References

1. Ghose BB and Basu AK. Observation on estuarine pollution of the Hooghly by the effluents from a chemical factory complex at Rashasa, west Bengal Env. *Health* 1968; 10: 29-218.
2. Gupta S and Shukla DN. Physico-Chemical analysis of sewage water and its effect on seed germination and seedling growth of sesamumindicum. *J Nat-Ras. Development.* 2006; 1: 5-19.
3. Patil DB and Tijare RV. Studies on Water Quality of Gadchiroli Lake. Pollution Research, 2001; 20: 257-259.
4. Singh RP and Mathur P. Investigation of physiochenmical characteristics of fresh water reservoir of Ajmer city Rajsthan. *Ind. J. Env. Sci*., 2005; 9: 57-61.
5. Hutchinson GE. A Treatise on Limnology. Vol I part 2 Chemistry of lakes. John Willey and Sons, New York. 1957.
6. Baruah BK, Talukdar S and Borthakur CR. Water Quality of Ponds in Chandrapur area of Kamrup district. *Assam Eviron and Ecol*., 1998; 16(2): 254-256.

7. American Public Health Association (APHA). Standards methods for examination of water and wastewater. American Public Health Association Inc, Washington DC 20th Edition. 1998.
8. Rao AS, Rao PR and Rao S. Degradation of Kolleru lake *Ind. J. Env, Hlth*., 1999; 41(4): 300-311.
9. Adebowale KO, Agunbiade FO and OluOwolabi BI. Impact of natural and anthropogenic multiple sources of pollution on the environmental condition of Ondo state costal water Nigeria. *Ejeafche*., 2008; 5(2): 2797-2811.
10. Singh BN and Rai S. Physico-chemical studies of Dah Lake. 1999.
11. Ilyas M. Zooplanktonic diversity of Bendusara Project dist. Beed. (M.S.) India Ph.D. Thesis. 2002.
12. Kaul V, Handoo J K and Raina R. Physico-chemical characteristics of Nilnag - A high altitude forest lake in Kashmir and its comparison with the valley lakes. Proc. *Indian Natn. Sci. Acad.* B., 1980; 46(4): 528-541.
13. Patil CS and Gaudar BYM. Ecological study of fresh water zooplankton of a subtropical pond (Karnataka State India) Int. Revue, *Ges. Hydrobiol*., 1985; 70(2): 259-267.
14. Adoni AD. Work Book of Limnology. Bandna Printing service, New Delhi. 1985.
15. Georage MG. Comparative plankton ecology of five fish tanks in Delhi, India. *Hydrobiol*., 1996; 27: 81-108.
16. Saran HM and Adoni AD. Studies on seasonal variations in calcium magnesium and total hardness in Sagar Lake. *Bull. Bot. Soc*., 1982; 30 & 31 66-68.
17. Singh DN. Seasonal variation of zooplankton in tropical lake. *Geobios*., 2000; 27(2-3) 97- 100.
18. Ganapati SV. Ecology of tropical waters. In: P. Kachroo (ed). Proceedings of the Symposium on algology. *Indian Council of Agricultural Research,* New Delhi. 1960.
19. Zafar AR. On the Ecology of algae in certain fish ponds of Hyderabad. India physico-chemical complexes, *Hydrobiologia*., 1964; 23: 179-195.
20. Prakash. Seasonal variation in the physicochemical characteristics of perennial ponds of Jhbua M.P. *J. Aqu. Biol. Fish.,* 1994; 1(1): 43-47.
21. Awasthi YC, Yang Y, Tiwari NK *et al*. Regulatoin of 4-hydroxynonenal-mediated signaling by glutathione-S-transferases. *Free RadicBiol Med*., 2004; 37: 607-619.
22. Sheeba S and Ramanujan N. Qualitative and quantitative study of zooplankton in Ichikkara River Kerala. *Poll. Res*., 2005; 24(1): 119-122.

How to cite this article:

Patil R. B. 2018, To Study the Physico-Chemical Parameters of Nandurmadhmeshwar Dam, Nashik District, Maharashtra, India. *Int J Recent Sci Res.* 9(8), pp.28451-28455.DOI: http://dx.doi.org/10.24327/ijrsr.2018.0908.2462

****