

**STUDIES ON PHYSICO-CHEMICAL PARAMETERS OF LOWER ANICUT (ANAIKARAI),
THANJAVUR Dist, TAMILNADU, INDIA**

P. Nambirajan¹, P. Anandaraj², M. Tamilselvi³ and G. Shakila⁴

*^{1,2} Department of Zoology and Biotechnology, A.V.M.Sri Pushpam College (Autonomous), Poondi -613 503,
Thanjavur – Dt, Tamil Nadu, India.*

^{3,4} Amphigene Research Laboratories, Mariamman Kovil, Thanjavur – 613 501, Tamil Nadu, India

**Corresponding Author Email: amphigene.tnj@gmail.com*

ABSTRACT

In this study, we examined the Physico-chemical parameters in water from lower Anicut reservoir. Water quality parameters from active and resting reservoir water were taken in period of six months from March 2012 to August 2012 both dry and wet seasons at the lower Anicut, Thanjavur Dt. The total rainfall, Humidity and wind velocity were observed during the month of March 2012 to August 2012. Temperature, pH, salinity, dissolved oxygen (D.O.) and free carbon dioxide were examined to determine the suitable conditions of the reservoir and seasons for optimum fish production. There are some seasonal variations to be recorded to these months depends upon on the ecological fluctuations. The Physico-chemical parameters in reservoir sample for the two seasons (dry and wet) were interrelated with slight differences in their concentrations, levels and readings. From the data generated all the parameters were within the desirable standard for fish culture in all the reservoirs within the seasons. However, the quality of water in the active reservoir was significantly better.

KEYWORDS

Physico-chemical parameters, Lower Anicut reservoir.

INTRODUCTION

Aquatic ecosystem is the most diverse ecosystem in the world. The first life originated in the water and first organisms were also aquatic where water was the principal external as well as internal medium for organisms. Thus water is the most vital factor for the existence of all living organisms. Water covers about 71% of the earth of which more than 95% exists in gigantic oceans very less amount of water is contained in the rivers (0.00015%) and lakes (0.01%), which comprise the most valuable fresh water resources. Global aquatic ecosystems fall under two broad classes defined by salinity – freshwater ecosystem and the saltwater ecosystem. Freshwater ecosystems are inland waters that have low concentrations of salts. The

salt-water ecosystem has high concentration of salt content (averaging about 3.5%). The study of freshwater habitats is known as limnology. Freshwater habitats can be further divided into two groups as lentic and lotic ecosystems based on the difference in the water residence time and the flow velocity.

Anaikarai is a village panchayat under thiruvudaimaruthur taluk in Tanjore District, Tamil Nadu, India. Anaikarai (Lower Anicut) it was built at 1912 (as marked in the bridge) nearly 100 years old. Anaikarai connects with two major bridges. Nearly 1 km long on both sides. It is an island in the Basin of Cauvery River. The Anaikarai dams situated the river named as Kollidam. It being a narrow bridge on north, The dams looks like an older one similar to Kalanai, is

locked to release water through canals to save and prevent water from flowing through river to merge with sea. Nearly 2000 families live in Anaikarai with the main occupation of agriculture and fishing. It is well known and place for river fishes. Anaikarai remains an important connecting point between Chennai and Kumbakonam.

AIM AND SCOPE OF THE PRESENT STUDY

In the present investigation, it is proposed to study certain hydrological factors such as Total rainfall, Humidity, wind velocity, water temperature, pH, salinity, dissolved oxygen, free Co₂ in the Lower Anicut at Thanjavur district during the months of March 2012 – Aug 2012.

MATERIALS AND METHODS

Description of the Study Area

The data for the present study were collected from March 2012 to August 2012 in the freshwater reservoir of Lower Anicut reservoir at Thanjavur district, TamilNadu, India. The Lower Anicut is located about 45 Km from Thanjavur.

ANALYSIS OF PHYSICOCHEMICAL PARAMETERS IN WATER SAMPLES

Collection of Water Sample

Water samples are collected for a period of six months (March 2012 to Aug 2012) from the Lower Anicut reservoir. The readings were taken for the physicochemical parameters such as Total rainfall, Humidity, wind velocity, water temperature, pH, salinity, dissolved oxygen; free CO₂ for monthly interval regularly.

Determination of Temperature

The water temperature was measured by using mercury filled Celsius thermometer with an accuracy of 0.5°C. The surface water

temperature was measured by dipping thermometer directly on the water about the minute and reading was recorded.

Determination Of pH

The pH is a measure of hydrogen ion concentration in fresh water and indicates how much water is acidic or basic. The water samples from the reservoir were collected and transferred to the beaker. The pH of the water sample was determined by using digital pH meter.

Estimation of Salinity

The salinity is the total concentration of dissolved ions in the freshwater fish culture. The Mohr's titration method was adopted for determination of salinity (APHA, 1998).

Estimation of Dissolved Oxygen

The standard Winkler's method was adopted (Strickland and Parsons, 1972) for the estimation of dissolved oxygen in the experimental fish culture tank.

Estimation of Carbon Di Oxide

Free carbon-Di- oxide is liable to escape easily from the water sample and hence, the analysis was carried out immediately. The amount of Carbon dioxide was estimated according to the standard method (APHA, 1998)

RESULT AND DISCUSSION

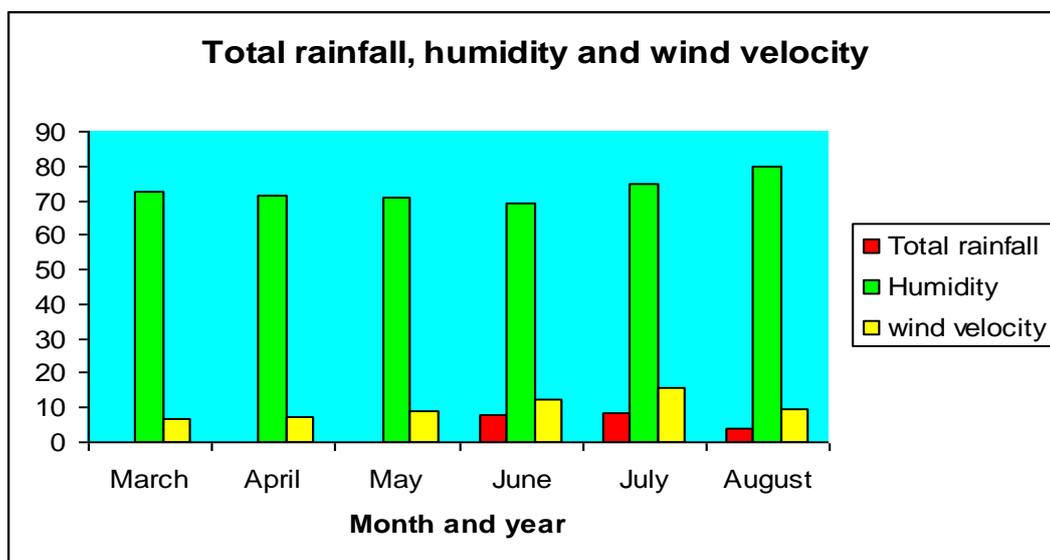
Total Rainfall, Humidity and Wind Velocity

The total rainfall, Humidity and wind velocity were observed during the month of March 2012 to August 2012. There are some seasonal variations to be recorded to these months depends upon on the ecological fluctuations. The average values of rainfall, Humidity and wind velocity 3.38 %, 73.18 and 10.03 % were observed during the study period. The results are showed in **Table 1and Fig 1.**

Table: 1 Total rainfall, humidity and wind velocity of the Lower Anicut reservoir, during March 2012 to Aug 2012

S. No	Month and Year	Total rainfall (mm)	Humidity (%)	Wind velocity (Km/h)
1.	March	0	72.3	6.6
2.	April	0	71.7	7.5
3.	May	0	71.0	9.0
4.	June	7.9	69.4	12.2
5.	July	8.2	75.0	15.6
6.	August	4.2	79.7	9.3
	Average	3.38	73.18	10.03

Fig 1 - Total rainfall, humidity and wind velocity of the Lower Anicut



Temperature

Temperature is an important physical factor, which influence the other hydrological parameters. The maximum water temperature (30° C) was recorded in the month of May 2012

and the minimum (27°C) was in March 2012. The observation indicates that the surface water temperature is lesser and closely associated with the humidity and moisture (Table 2 and fig 2).

Table: 2 The Physico Chemical factors of Lower Anicut, during March 2012 to August 2012

S. No	Month and Year	Temperature (°C)	pH	Salinity	Dissolved	Free CO2 (mg/l)
		Surface water		(ppt)	O2 (ml/l)	
1	March	27	7	0.13	2.706	0.004
2	April	29	7.6	0.12	4.681	0.002
3	May	30	7.4	0.12	4.043	0.006
4	June	27	7	0.13	5.626	0.003
5	July	30	7.5	0.12	4.053	0.005
6	August	28	7.2	0.11	5.053	0.002

Fig 2 – Shows the observation of Temperature in Lower Anicut during March 2012 to August 2012

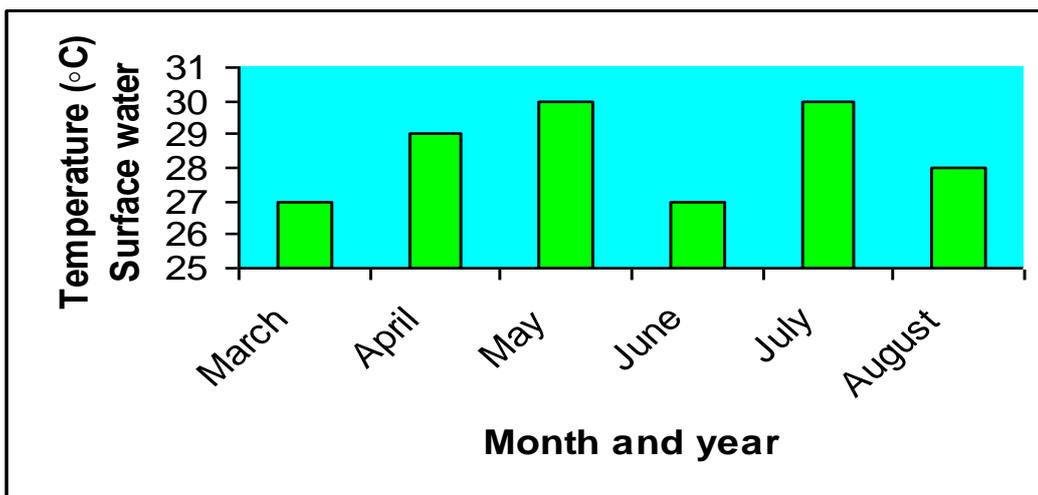


Fig 3 - The pH in Lower Anicut during March 2012 to August 2012

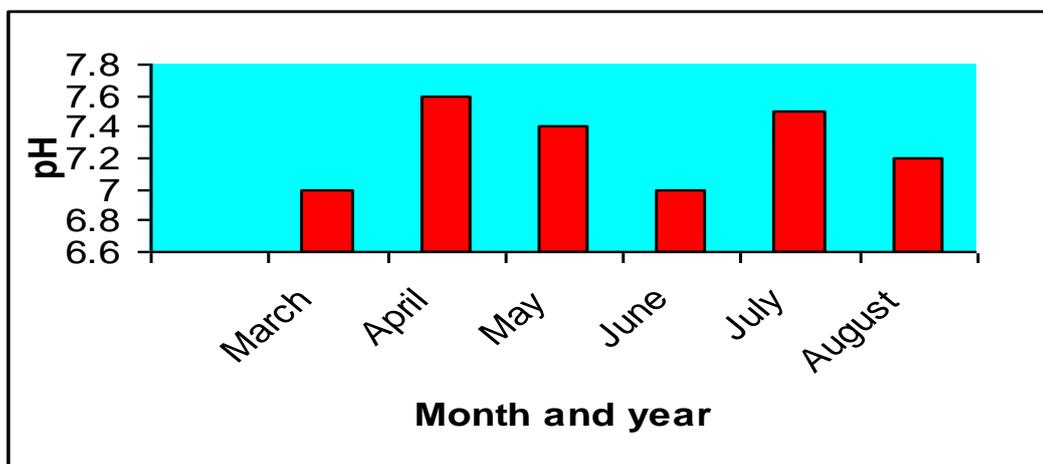


Fig 4 - The Salinity in Lower Anicut during March 2012 to August 2012

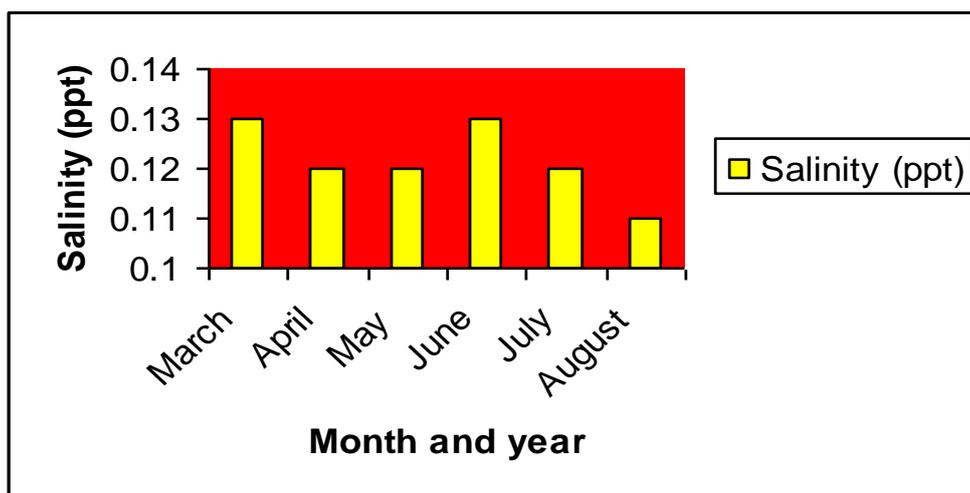


Fig 5 - The Dissolved O₂ in Lower Anicut during March 2012 to August 2012

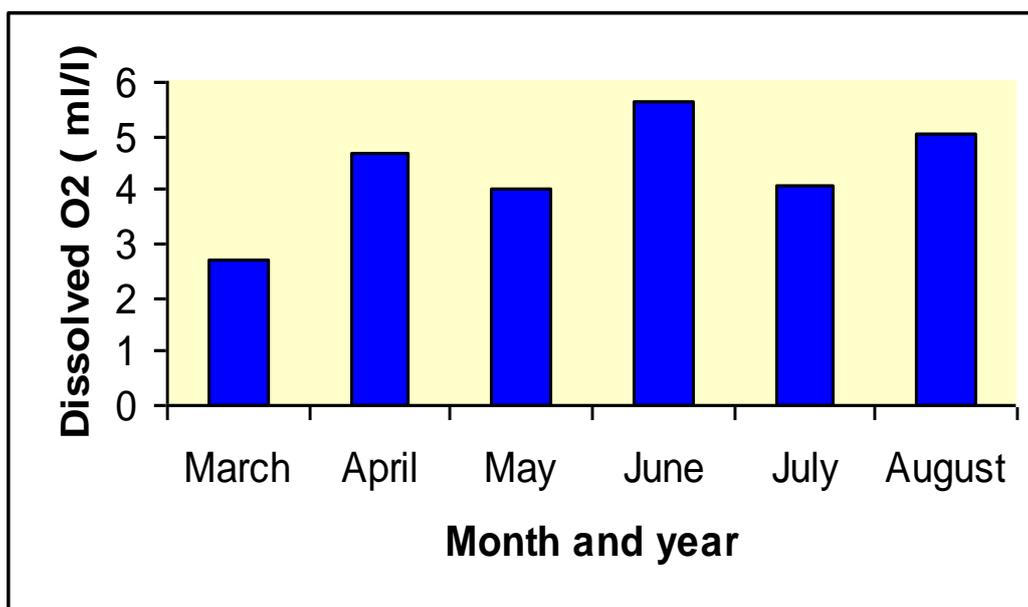
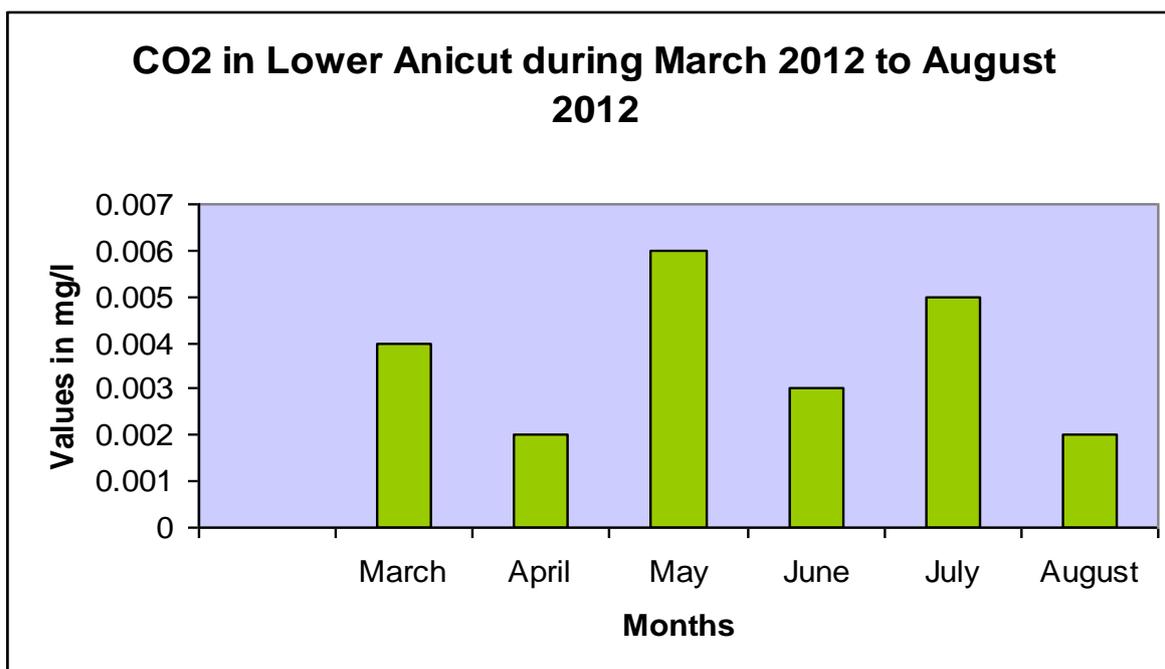


Fig 6 - Showing the CO₂ in Lower Anicut during March 2012 to August 2012



Hydrogen Ion Concentration (pH)

Seasonal variations in pH of freshwater were relatively small. The pH is an important hydrological factor. The hydrogen ion concentration was always found to be neutral and slightly above 7.0. The maximum level of pH

(7.6) was recorded in May 2012 and minimum value of pH (7.0) was recorded in March 2012 (Table 2 and fig 3).

Salinity

Salinity acts as a limiting factor in distribution of flora and fauna. The salinity of Lower anicut was

recorded between 0.11 ppt and 0.13 ppt. It was found to be lower 0.11 ppt in May 2012 and higher 0.13 ppt in July 2012 (**Table 2 and fig 4**).

Dissolved Oxygen

Dissolved oxygen is an important chemical factor for respiration which would get influenced by aquatic organisms. The fluctuation in the concentration of dissolved oxygen content varied from 2.8 ml/l to 5.0 ml/l. The maximum value of 5.0 ml / l was observed in March 2012 and minimum value of 2.8 ml/l was observed in August 2012 (**Table 2 and fig 5**).

Free Carbon – Di – Oxide

Free carbon dioxide is also an important chemical factor which required for photosynthesis of all aquatic plants. In the present study, the free carbon dioxide level slightly fluctuates during the observation period. It varied from 0.002 to 0.6mg/lit (**Table 2 and fig 6**).

CONCLUSION

From this investigation, it has been understood that the physicochemical characteristics are suitable for the growth of the fishes. The fresh water pond is a eutrophic pond which

experiences seasonal fluctuations in physicochemical and biological conditions. As urbanization increases around the world, many of these reservoirs are being created to hinder in controlling runoff. There is considerable need for additional quantitative data and a better understanding of these small impoundments so they may be managed more effectively. Based on the present study, it may be concluded that the Physico-chemical characters vary in each month according to the ecological influence.

REFERENCES

- Abdus Salam Bhuiyan (2006), food and feeding habit of the juvenile and adult snakehead, *Channa punctatus* (BLOCH), *J. Life Earth Sci.*, Vol.1(2):Pp53-54.
- Amita saxena (2002) biochemical changes in blood of *Channa SPP* *Indian J. Anim.* Vol.36 (1) pp: 22–26.
- Ashok, K. Agarwal and Govind, S. Rajwar, 2010. Physico-Chemical and Microbiological Study of Tehri Dam Reservoir, Garhwal Himalaya, India. *Journal of American Science*; 6(6):65-71.
- APHA (1998). *Standard Methods for the Examination of Water and Wastewater*, 20th edn. Washington, D.C.
- Tripathi Namrata Nath, Shukla, J.P. and Mishra, M. 2008. Seasonal variations in hydrological parameters and biodiversity of ichthyofauna of Sikandrapur reservoir, Basti, (U.P.), *Journal of Ecophysiology & Occupational Health* Vol: 8, Issue: 1 & 2.



***Corresponding Author:**

P. Nambirajan¹

Assistant Professor,
Department of Zoology and Biotechnology,
A.V.V.M. Sri Pushpam College (Autonomous),
Poondi -613 503, Thanjavur – Dt,
Tamil Nadu, India.