



## A PRELIMINARY STUDY ON THE WATER QUALITY PARAMETER OF FISH CULTURE POND

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### ABSTRACT :

*Life on the earth is never possible without water. Water is one of the essential constituents of the environments. This study was designed to assess the quality of ponds water in Golden fish pond, Karanthai, Thanjavur District (10.780N, 79.130E), Tamilnadu, India. state has been evaluated on a seasonal bass is from Aug 2016 to Jul 2017. The water sample were sample were analyzed for various physicochemical parameters like Colour, pH, COD, BOD and Nitrate, etc. The parameter assessed pH ( $7.596 \pm 0.197$ ), BOD ( $149 \pm 1.41$ ), COD ( $79.5 \pm 7.77$ ). The experimental values of various physicochemical parameters of water sample rests were largely. This study will study will and fish farmers on the necessary treatment needed to effectively use water from this source for fish farming.*



**KEYWORDS :** *physicochemical, BOD, COD, pH.*

### INTRODUCTION:

Intensification of aquaculture has become an important practice in recent year to optimize the returns (Mastan 2015). On a worldwide scale, fisheries landings remain constant at about 90 million tons of fish where as commercial aquaculture supplies perse is approximately 60 million tone and is increasing at a rate of about 8% per annum (Einar Ring *et al.*,2012).

Fish is a reasonable wellspring of protein and a critical money crop in numerous districts of world and water is the physical help in which they complete their life capacities, for example, sustaining, swimming, rearing, processing and discharge ( Bronmark and Hansson 2005). Water quality is dictated by different physic-compound and natural factors as the creation of fish and other sea-going creatures (Moses, 1983). Every living life form have bearable cutoff points of water quality parameters in which they perform ideally. In this way to satisfy the need of present nourishment supply, water quality administration in fish lakes is a fundamental advance that is required to be taken up.

In the majority of the nations, angles are developed in lakes (lentic water) however sadly such culturists are not all that mindful of significance of water quality administration in fisheries. The job of different elements like temperature, straightforwardness, turbidity, water shading, carbondioxide, pH, alkalinity, hardness, smelling salts nitrite, nitrate, essential efficiency, Biochemical Oxygen Demand (BOD), tiny fish populace and so forth. Water quality examination is a standout amongst the most imperative in groundwater ponders. Assurance of physic-concoction attributes of water is fundamental for surveying the appropriateness of water for different purposes like drinking, household, mechanical and water system. Aquaculture play a vital role in many countries by offering betty nutrition higher income. Foreign exchange and better employment opportunities. Aquatic ecosystems are affected by

several health stressors that significantly deplete biodiversity. Though water is a renewable resource, reckless usage and improper management of water system may cause serious problems in availability and quality of water is usually determined by its physicochemical characteristics.

Despite the existing studies by Adeniji and ovie (1982); Joseph *et al.*, (1993), Curtis (1994) as cited in Solomon *et al.*, (2007). On some natural water bodies with respect to water quality, information about these critical water quality parameters in fish ponds are scanty in many areas of Nigeria, particularly in kano state here there is rise of this fledgling industry. A pond is referred to as man-made or natural water body is which is 1cm<sup>2</sup> and 2ha (5acres or 20,000m<sup>2</sup>) in area, which holds water for four months of the year or more Biggs *et al.*, (2005). Fish is also a part of natural resources requiring urgent conservation effort to human destructive habit on their natural habitats. A pond with good water quality will produce more and healthier fish than a pond with poor water poor water quality (Boyd 1998). Water quality means the component of water which must be present for optimum growth of aquatic organisms ( Ehiagbonare., 2010). Water quality is not constant in nature but varies with the time of the day, season, weather conditions, water source, soil type, temperature, stocking density, feeding rate and culture system.

The important factors considered for aquaculture activity in dude dissolved oxygen, water hardness, turbidity, alkalinity, nutrient content, temperature , turbidity, alkalinity, nutrient content, water depth etc, which have been observed to b responsible for the proper performance of certain fish species in a natural fish pond (Ehiagbonar *et al.*, 2010). Water quality management also generate significant conservation impact on fish species at their natural state by limiting human pressure on flourishing but limited population that exists in the or natural fish pond rivers, seas, and ocean as a whole. In India about half of the complete developed territory under water system is reliant upon groundwater and of this, about 60% of inundated sustenance creation relies upon groundwater wells (Shah *et al.*, 2000; CWC, 2000).

## MATERIALS AND METHODS

Water sample were collected from farm name Golden fish pond, Karanthai, Thanjavur (Dt) (10.780N, 79.130E), Tamil Nadu, India. The cultural pond water sample were collected in clean sterile plastic containers, during the study August 2016 to July 2017. The sample were transported to the laboratory within 3 hours for analysis of physicochemical parameters. The physicochemical characters includes, the determination of temperature, pH, turbidity, salinity, O<sub>2</sub> content, Co<sub>2</sub> content, iron, nitrite and phosphate by using standard the methods of ( Eaton *et al.*, 1995).

The standared techniques were followed for collection and fungal analysis of infected fish as described (Dudka *et al.* , 1991). The various tissue of infected fish sample was inoculated inspread plated technique was employed to fungal population were determined using potato dextrose agar medium.

## RESULTS

The physicochemical parameters are give in Table-1. In present study, the culture pond water quality shours it clearly indicate the change in temperature, O<sub>2</sub> level, Organic load, nitrate source, oxygen, and carbondioxide create suitable condificen in the environment where the fish lives The water sample were collected from Mariamman kovil,of thanjavur distrct and were analyzed for their physicochemical characteristics. The temperature, odour and test of the samples were noted at the colletion point immediately.

### Colour

Colour an important paramerter for any aquactic water body and indicater the purity of the water. The colour is national agricultural extension and research states pale colour. The present study the pond water color is list green so the pond water is good for fish productivity.

## pH

The survival and growth of fish are also depending of pH of the water. The pH of fresh water ponds can fluctuate considerably both daily and seasonally. In the present study pH value recorded ranged from 7.1 to 8.0. In value is tending towards naturally which is also within the values for optimum fish survival (Stevens 2007). The highest value of pH was recorded during summer season ( $7.596 \pm 0.197$ ) and the lowest was recorded during postmonsoon ( $7.13 \pm 0.04$ ). The low value during postmonsoon season may be due to the dilution of rain water. These values compared very well with results of other workers (Bhathagar *et al.*, 2013, Jesu *et al.*, 2013).

## BOD

Biochemical Oxygen Demand is a parameter assesses the organic load in water body. It is the measurement of total dissolved oxygen consumed by microorganism for biodegradation of organic matter (Stevens 2007). The maximum demand of oxygen in the water was recorded during premonsoon was ( $149 \pm 1.41$ ). The minimum demand of oxygen in the water was recorded during postmonsoon ( $115 \pm 7.07$ ) due to less vegetation water evaporated in post monsoon period so lowest value.

## COD

is an important parameter for establishing the quality of water. It determines the amount of oxygen required for chemical oxidation of organic and inorganic matter (Jeyaraj *et al.*, 2014). The COD level was maximum during pre monsoon  $79.5 \pm 7.77$  and minimum during post monsoon  $62 \pm 4.42$ . Similar results were observed by various researchers Shyamala (Udhayakumar *et al.*, 2006) Prameena Sheeja (Prameena, 2016).

## NITRATE

It is thought to be produced by autotrophic *Nitrobacter* combining oxygen with nitrite in the converter and on the wall of the pond (Sajitha *et al.*, 2016). Nitrate is however not harmful to fish. The nitrate level was recorded maximum during summer ( $0.06 \pm 0.02$ ) and minimum during post monsoon season ( $0.01 \pm 0$ ). M. Jeyaraj (Ramadev *et al.*, 2009) Bhavimani (Ancy mol *et al.*, 2016) gave the favorable range of 0.1 mg/L to 4.00 mg/L. The values obtained are within WHO and ICMR limits.

## DISCUSSION:

The water quality parameters for the five selected ponds in Ado-Ekiti fall within the values recommended for fish culture (Huet 1972, Boyd, 1979). pH is an important limiting factor in fish culture. It indicates the acid base balance of the water. The survival and growth in fish is also depending on pH of the water. The range of the pH obtained from this study was  $7.596 \pm 0.197$  pond. This is slightly acidic compared with the guideline but agrees with values reported by Store and Thomfore (2003) as acceptable range. It was also more acidic when compared with reports. Biochemical oxygen demand varied significantly among the ponds. The highest value was  $149 \pm 1.41$  in pond. According to the guidelines for water quality Golden fish pond, Karanthai, Thanjavur (Dt) (10.780N, 79.130E), Tamil Nadu, India. The optimum BOD level for aquaculture should be less than 10mg/l. chemical oxygen demand the present study revealed the COD ranged from  $79.5 \pm 7.77$ . The most common application of COD is in quantifying the amount of oxidizable pollutants found in surface water (e.g. lakes and rivers) or wastewater WHO (BIS 1991) suggested the value of chemical oxygen demand should be 10mg/l but in the present study the value exceeded the desirable limit. So the water of these ponds is not suitable for drinking purpose.

**Table-I physicochemical parameter of carp culture pond**

S. N	Parameters	Pre monsoon	Monsoon	Post monsoon	Summer
1	Colour	< hue	< hue	< hue	< hue
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	Turbidity	12.5±3.53	6.66±2.38	16±1.41	11.66±2.886
4	Totaldissolved solids	688.5±40.30	651±32.8	612±2.32	774±10.311
5	pH	7.22±0.04	7.15±0.08	7.13±0.04	7.596±0.197
6	Electrical conductivity	1.07±0.06	1.01±0.05	0.91±0.07	1.21±0.160
7	BOD	149±1.41	115.3±10.01	115±7.07	134±17.776
8	COD	79.5±7.77	65.3±8.08	62±4.42	64.66±5.507
9	Carbonate	Nil	Nil	Nil	Nil
10	Bicarbonate	189±4.24	158.6±9.50	151±2.32	116.3±12.423
11	Chloride	237±29.69	177±13.11	170.5±2.12	84.33±2.51
12	Sulphate	96.5±0.70	716±15.16	76±2.32	36±2.645
13	Phosphate	0.02±7.07	0.02±5.77	0.01±0	0.043±0.020
14	Silicate	4.49±0.28	4.27±0.07	3.73±0.32	4.296±0.056
15	Nitrate	0.05±0.04	0.02±5.77	0.01±0	0.066±0.06
16	Nitrite	Nil	Nil	Nil	Nil
17	Fluoride	2.91±0.06	0.35±0.43	2.86±0.03	3.22±0.055
18	Aluminium	Nil	Nil	Nil	Nil
19	Calcium	203±24.04	179.6±5.03	177±4.24	117.6±11.015
20	Magnesium	82±9.39	72.3±3.05	67±2.32	53±1
21	Sodium	87±12.72	80.6±5.13	85±4.24	3±58.208
22	Potassium	0.02±7.07	0.18±0.03	0.15±0.02	0.15±0.017
23	Zinc	0.02±7.07	0.02±5.77	0.15±0.02	0.01±0
24	Copper	0.02±7.07	0.01±0	0.02±0	0.01±5.77
25	Iron	0.05±7.07	0.01±0	0.02±0	0.03±5.77
26	Manganese	0.05±7.07	0.01±0	0.01±0	0.02±0.01
27	Chromicum	Nil	Nil	Nil	Nil
28	Lead	Nil	Nil	Nil	Nil

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