

CHAPTER 2. PHYSICAL PARAMETERS OF WATER

COLOUR

In natural water, colour is due to the presence of humic acids, fulvic acids, metallic ions, suspended matter, plankton, weeds and industrial effluents. Colour is removed to make water suitable for general and industrial applications and is determined by visual comparison of the sample with distilled water.

Visual comparison: About 20ml of the sample and 20ml of distilled water were taken in two separate wide mouthed test tubes. The results were tabulated (as clear, greenish, greyish, brownish, blackish, etc) by comparing the colour of the sample with distilled water.

ODOR:

Odor of water is due to the accumulation of excretory wastes and organic and inorganic loads and also due to pollution. The odor of the investigated pond water was smelt by nose. The odor of an ideal pond water is not fishy or odorless (Das, 1997).

TEMPERATURE

Impinging solar radiation and atmospheric temperature brings about spatial and temporal changes in temperature, setting up convection currents and thermal stratification. Temperature plays a very important role in wetland dynamism affecting the various parameters such as alkalinity, salinity, dissolved oxygen, electrical conductivity etc. In an aquatic system, these parameters affect the chemical and biological reactions such as solubility of oxygen, carbon-di-oxide-carbonate-bicarbonate equilibrium, increase in metabolic rate and physiological reactions of organisms, etc. Water temperature is important in relation to fish life. The temperature of drinking water has an influence on its taste.

Apparatus required: Thermometer- 0.1° C division.

Procedure: Temperature measurement is made by taking a portion of the water sample (about 1litre) and immersing the thermometer into it for a sufficient period of time (till the reading stabilizes) and the reading is taken, expressed as °C.

TRANSPARENCY (LIGHT PENETRATION)

Solar radiation is the major source of light energy in an aquatic system, governing the primary productivity. Transparency is a characteristic of water that varies with the combined effect of colour and turbidity. It measures the light penetrating through the water body and is determined using Secchi disc.

Apparatus required: Secchi disc, a metallic disc of 20cm diameter with four quadrants of alternate black and white on the upper surface. The disc with centrally placed weight at the lower surface, is suspended with a graduated cord at the center.

Procedure: Transparency is measured by gradually lowering the Secchi disc at respective sampling points. The depth at which it disappears in the water (X_1) and reappears (X_2) is noted. The transparency of the water body is computed as follows:

$$\text{Transparency (Secchi Disc Transparency)} = \frac{(X_1 + X_2)}{2}$$

Where, X_1 = Depth at which Secchi disc disappears

X_2 = Depth at which Secchi disc reappear

Turbidity (NTU) = (Nephelometer readings) (Dilution factor*)

If the turbidity of the sample is more than 40 NTU, then the sample is diluted and the dilution factor is accounted in final calculations.



Fig:5 Secchi disc

CHAPTER 3:- CHEMICAL PARAMETERS OF WATER

pH:

pH or the concentrations of hydrogen ions (H^+) present in pond water is a measure of acidity or alkalinity. The pH scale extends from 0 to 14 with 0 being the most acidic and 14 the most alkaline. pH 7 is a condition of neutrality and routine aquaculture occurs in the range 7.0 to 9.0 (optimum is 7.5 to 8.5). Exceedingly alkaline water (greater than pH 9) is dangerous as ammonia toxicity increases rapidly. At higher temperatures fish are more sensitive to pH changes.

It is an important chemical parameter to consider because it affects the metabolism and other physiological processes of culture organisms. A certain range of pH (pH 6.8 — 8.7) should be maintained for acceptable growth and production. But in semi-intensive culture, the optimum range is better maintained between pH 7.4 — 8.5. pH 7 is the neutral point and water is acidic below pH 7 and basic above pH 7. pH changes in pond water are mainly influenced by carbon dioxide and ions in equilibrium with it. pH can also be altered by a) Organic acids, these are produced by anaerobic bacteria ("acid formers") from protein, carbohydrates and fat from feed wastes. b) Mineral acids such as sulfuric acid (acid-sulfate soils), which may be washed down from dikes during rains and c) Lime application.

Like DO, a diurnal fluctuation pattern that is associated with the intensity of photosynthesis, occurs for pH. This is because carbon dioxide is required for photosynthesis and accumulates through nighttime respiration. It peaks before dawn and is at its minimum when photosynthesis is intense. All organisms respire and produce Carbon dioxide CO_2 (continuously, so that the rate of CO_2 production. Depends on the density of organisms. The rate of CO_2 consumption depends on phytoplankton density. Carbon dioxide is acidic and it decreases the pH of water. Also, and carbonate would decrease. The consumption of CO_2 during photosynthesis causes pH to peak in the afternoon and the accumulation of CO_2 during dark causes pH to be at its minimum before dawn.

Method employed : Electrometric method

Apparatus required: Glass electrode, reference electrode (mercury/calomel or silver/silver chloride) and pH meter.

Procedure:

The pH is determined by measuring the Electro Motive Force (E.M.F) of a cell comprising an indicator electrode (an electrode responsive to hydrogen ions such as a glass electrode) immersed in the test solution and the reference electrode (usually a mercury/calomel electrode). Contact between the test solution and the reference electrode is usually got by means of a liquid junction, which forms a part of reference electrode. E.M.F of this cell is measured with pH meter, that is a high impedance voltmeter calibrated in terms of pH. The electrode is allowed to stand for 2 minutes to stabilize before taking reading for reproducible results (at least ± 0.1 pH units).

Salinity:

Salinity is the measure of all the salts dissolved in water. Salinity is usually measured in parts per thousand (ppt or ‰). The average ocean salinity is 35ppt and the average river water salinity is 0.5ppt or less. This means that in every kilogram (1000 grams) of seawater, 35 grams are salt. Because the water in estuaries is a mix of fresh water and ocean water, the salinity in most estuaries is less than the open ocean. Bottom water almost always contains more salt than surface waters.

The salinity of water is an important measure of water quality because different species of animal and plant life survive in different ranges of salinity. Even a small change in salinity could cause stress, or even death, to these organisms and could have a devastating effect on the local, and wider, ecosystem.

CHAPTER 5:- RESULTS

AQUA ONE CENTRE(AOC)
 P.O. Arde Venkata Kutuba Berao, P-9-51, Telapeta, Nagyzylanka Village & Mandal, Krishna District, P.N. 521120 A.P.

WATER ANALYSIS REPORT DATE: 14-07-2022

Name: **B. SUDHAKARAYARA**
 Address: **KODURU**

TEST PARAMETERS	Approximate Range	sample B1	sample B2	sample B3	sample B4	sample B5	sample B6	sample B7	sample B8	sample B9	sample B10	sample B11	sample B12
pH	7.5-8.5	7.7	7.7	8.4	8.1	8.4	8.4	8.1	8.1	8.1	8.1	8.1	8.7
Salinity(ppm)	10 to 25	8	8	8	8	8	8	8	8	8	8	8	10
DO(ppm)	>4.0	7.6	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	7.9
Total(ppm)	100-200	110	110	80	80	110	110	110	110	110	110	110	110
ALKALINIT Y (PPM)	carbonates (Co3)	10	20	10	10	20	10	10	10	10	10	10	20
	Bicarbonates (HCo3)	80-200	100	80	70	70	90	60	60	80	80	80	90
Total	Based on salinity	1200	1100	2800	2950	1600	1100	1250	1100	1100	1100	1100	1250
Hardness (ppm)	Ca++	Based on salinity	1120	1100	1120	1180	950	950	950	980	1100	1000	1250
	Mg++	Based on salinity	2080	1660	1680	1770	2150	2100	2220	2500	2100	2250	2250
	Ca+ Mg+	Based on salinity	448	448	448	475	515	515	544	600	554	540	540
Ammonia(ppm)	T Ammonia	<0.5	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
	U Ammonia	<0.1	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (ppm)	<0.25	-	-	-	-	-	-	-	-	-	-	-
	Nitrate (ppm)	Based on salinity	-	-	-	-	-	-	-	-	-	-	-
	Iron (ppm)	<0.1	-	-	-	-	-	-	-	-	-	-	-
	H2S(PPM)	<0.02	-	-	-	-	-	-	-	-	-	-	-
	Phyto plankton	As Applicable	-	-	-	-	-	-	-	-	-	-	-

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AQUA ONE CENTRE(AOC)
 P.O. Arde Venkata Kutuba Berao, P-9-51, Telapeta, Nagyzylanka Village & Mandal, Krishna District, A.P. Pin. 521120

WATER ANALYSIS REPORT date:12-07-2022

Name Of the Farmer : **PRASAD**
 Address: **KODURU**
 Contact Mobile NO: **8522016346**

TEST PARAMETERS	Approximate Range	sample B1	sample B2	sample B3	sample B4	sample B5	sample B6	sample B7	sample B8	sample B9	sample B10	sample B11	sample B12
pH	7.5-8.5	8.71											
Salinity(ppm)	10 to 25	20											
DO(ppm)	>4.0	7.8											
Total(ppm)	100-200	190											
ALKALINIT Y (PPM)	carbonates (Co3)	10 TO 40	20										
	Bicarbonates (HCo3)	80-200	170										
Total	Based on salinity	4250											
Hardness (ppm)	Ca++	Based on salinity	750										
	Mg++	Based on salinity	300										
	Ca+ Mg+	30:01	840										
Ammonia(ppm)	T Ammonia	<0.5	0.50										
	U Ammonia	<0.1	-										
	Nitrite (ppm)	<0.25	0.01										
	Nitrate (ppm)	Based on salinity	-										
	Iron (ppm)	<0.1	1										
	H2S(PPM)	<0.02	-										
	Phyto plankton	As Applicable	-										

Scanned by TapScanner

COLOR AND ODOR

The color of the investigated pond water was observed visually. The color of study pond 1 and 2 were found to vary from light to deep green. The deep green color represents higher planktons and light green color represents lower planktons. According to Das (1997), a well and phytoplankton enriched water body appears to be dark greenish blue, red or brown. The odor of the investigated pond water was smelt by nose. The odor of pond 1 was not fishy and odor of pond 2 fishy. The odor of an ideal pond water is not fishy or odorless (Das, 1997).

TRANSPARENCY

Transparency of the studied ponds is determined by using secchi disc and the results were observed as 22cm and 20 cm for pond 1 and pond 2 respectively. A slight variations in the transparency were observed during study period due to cloudy weather in those months but in remaining months the variation quite negligible.

BIOLOGICAL PARAMETERS:

The sample water is tested for the presence of various phytoplankton and zooplankton to learn about the planktonic growth within the pond and also to form an idea about the amount of feed to be given to the culture organisms or amount of fertilizers to be added to the pond. The observations of the present study are as follows.

Zooplankton:

1. In the sample 1 the following zooplankton has been observed.

- Rotifers: *Brachionus species*, *Filinia species* etc.
- Cladocerans: *Daphnia sp.*, *Moina sp.*, *Diaphanosoma sp.* Etc.
- Copepods: Cyclopoids and Calanoids were found.

2. In the sample 2 the following zooplankton have been observed.

- Rotifers: *Brachionus species*, *Filinia species* etc.
- Cladocerans: *Daphnia sp.*, *Moina sp.* Etc.
- Copepods: Cyclopoids and Calanoids were found.

(A) Community Survey Project
 Workdone Statement (log book)

S.No	Date	Day	Activity done	Signature of the Candidate
1.	25/05/22	1	Went to K. Nagaraju Home located at Ulagundam.	K. Nagaraju
2.	26/05/22	2	Went to Durga Prasad Home located at Palakaytippa	Durga Prasad
3.	27/05/22	3	Went to Srinivas Rao Home located at Ullipalem.	Srinivas
4.	28/05/22	4	Went to Chinnababu Home located at Narsimhapuram.	Chinnababu
5.	29/05/22	5	Went to Bhaskar Rao Home located at Koduru.	Bhaskar Rao
6.	30/05/22	6	Went to Raju Home located at Ullipalem	Raju
7.	31/05/22	7	Went to Seshu Home located at Koduru	Seshu