ISSN: 0976-3031

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

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 14, Issue, 10, pp.4231-4236, October, 2023

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

EVALUATION ON PHYSICOCHEMICAL PARAMETER OF SELECTED STATIONS FROM RIVER GODAVARI, ANDHRA PRADESH

Krishna. P.V, P.Vara Lakshmi, Dedeepya. P, Aradhya Sarma. B.V.L and K. Durga Rao

Department of Zoology & Aquaculture, Acharya Nagarjuna University, Nagarjuna Nagar – 522 510, Andhra Pradesh., India.

DOI: http://dx.doi.org/10.24327/ijrsr.20231410.0794

ARTICLE INFO

Article History:

Received 10th September, 2023
Received in revised form 19th September, 2023
Accepted 13th October, 2023
Published online 28th October, 2023

Keywords:

Physico-chemical parameters, Godavari River, Rajahmundry and Dhavaleswaram

ABSTRACT

The River Godavari is the largest of the peninsular rivers and the second longest river in India next only to Ganga. It is originated near Nashik (Maharashtra) in Northern Western Ghats. It flows across the Deccan Plateau from Western to Eastern Ghats through Maharashtra and Andhra Pradesh before emptying into the Bay of Bengal. It is a vital source of water for the people live surrounding villages, primarily for agriculture, aquaculture, domestic and industrial need. To assess the scale of water quality determine, water samples were collected and to evaluate different types of parameters. This study emphasis monthly variations of physic-chemical parameters of water. The results of present study evaluation showed that there was a significant monthly variation. The temperature was found to be maximum during summer months & minimum during winter months and range was 22-32ºC in Station-I and 24-32 ºC in Station-II. The pH of the water was found in slightly alkaline range throughout the study period and range was 7.4-8.6 in Station-I and 7.5-8.8 in Station-II. Dissolved oxygen showed marked variations and its goes to 4.0-5.4 mg/l in Station-I and 4.4-5.2 mg/l in Station-II. Total Alkalinity was 138-178mg/l in Station-I and 139-178mg/l in Station-II and Total Hardness was 129-190mg/l in Station-I and 118-199mg/l in Station-II with little bit fluctuations. However, phosphates and nitrate, were found to the slight monthly variations. The present study indicates that the fluctuations of physico-chemical parameters in the river region influence the feeding, breeding and other activities of fishes.

INTRODUCTION

Water is a most imperative renewable natural reserve resources which plays a vital role in the survival of all aquatic biota. It is vital factor of life and it is considered as precious compound on the earth. All living organisms on earth are so intimately connected with the water that life on this globe is believed to have evolved in and around water. Water condition is equally important for the survival and growth of organisms. Seasonal variations in both anthropogenic and natural processes such as temperature, DO, nitrates, phosphates and other parameters are affect the quality of river water and leads to different attributes for different seasons (Panchakshari *et al.*, 2015). Water quality interns of physical, chemical and biological characteristics may directly influence the water (Diersing Nancy, 2009). It is a measure the condition of water relative to the requirements of biotic species and or to any other purpose (Johnson *et al.*, 1997). The most common standards used to assess water quality related to drinking water, irrigation, fisheries, and safety of human.

The fresh water bodies of India are rivers, reservoirs, ponds, lakes, canals and dams. The riverine system with the construction of dams is directly or indirectly impact on animal life. The measurement of the productivity and energy of any water body needs assessment of physico-chemical parameters of water (Krishna *et al.*, 2023). The physico-chemical parameters are altered or modified due to the activities of human being that may directly impact metabolic conditions of fishes. Any alter in the environmental conditions may bring in an undesirable activities, which may lead to the pollution of that water body (Krishna *et al.*, 2013).

The ecological parameters has a directly influence the growth of plankton and other organisms. The pH of running water is slightly alkaline and it is better condition for the fishes. When turbidity is higher in water bodies leads to low dissolved oxygen. In winter, turbidity is reduce and therefore dissolved oxygen in water increases. When turbidity is low, there is good density of planktons. So, where the river is less turbid, abundance of plankton feeder fishes is higher, therefore species abundance is higher in the upper reaches of the river and tributaries. In turbid water, there is a reduction of dissolved

Corresponding author:* **Krishna. P.V
Department of Zoology & Aquaculture, Acharya Nagarjuna University, Nagarjuna Nagar – 522 510, Andhra Pradesh., India.

oxygen and availability of fishes reduces in such waters. The total alkalinity of the water bodies also varies from the maximum in winter and minimum in monsoon (Jhingran, 1991). The natural processes, such as precipitation inputs, erosion, weathering of crustal materials, as well as the anthropogenic influences also influence the water quality. Rivers play a major role in assimilation or carrying off municipal and industrial wastewater and runoff from agriculture land, aquaculture activities constitutes the constant polluting source whereas the later its seasonal phenomenon (Krishna *et al.*, 2017).

MATERIALS AND METHODS

Water samples of the present study were collected over a period of one year from 2 different stations of River Godavari region i.e.,

ST-1: Rajahmundry and ST-2: Dhavaleswaram were collected in the morning 8.30 AM and stored in a clean 500ml polythene container for further analysis. Temperature and transparency were recorded in the study area. The collection sample was utilized for further analysis of the following parameters like pH, Total alkalinity, Total hardness, Nitrites, Nitrates and Phosphates are recorded at the 2 Stations of the Godavari River. The samples for Dissolved Oxygen were fixed immediately in the collection point and the water analysis was done as the methods described in standard methods (APHA, 1980).

STATISTICAL ANALYSIS

The data of physico-chemical parameters of the River Godavari region during the June 2021 to May 2022 were subjected to statistical analysis for which SPSS 16.0 version was used. Among the parameters correlation and cluster analysis also analyzed.

Table 1 Physico-chemical parameters of the pond water in different months at Rajahmundry, Station-I in 2021-22

Study Period	Tem	Tr.	DO	pH	TA	TH	NO_2	NO_3	PO_4
Jun. 2021	26	40	4.9	7.4	165	179	0.092	0.90	3.2
Jul. 2021	28	35	5.2	7.6	155	129	0.085	0.95	3.5
Aug. 2021	23	32	5.1	8.0	148	168	0.083	0.92	3.9
Sep. 2021	24	28	5.2	8.6	159	129	0.094	0.96	4.3
Oct. 2021	24	29	4.5	7.8	160	170	0.096	0.78	4.7
Nov. 2021	23	30	5.4	8.4	138	146	0.093	0.63	5.1
Dec. 2021	22	34	4.8	8.2	150	190	0.088	0.80	5.6
Jan. 2022	25	34	4.0	7.5	165	175	0.099	0.92	5.1
Feb. 2022	26	35	4.2	7.6	175	158	0.096	0.98	4.7
Mar. 2022	30	35	4.4	7.8	178	149	0.094	0.73	4.3
Apr. 2022	30	37	4.9	8.2	155	165	0.086	0.71	3.9
May. 2022	32	39	4.8	8.4	149	155	0.083	0.63	3.6
Min	22	28	4.0	7.4	138	129	0.083	0.063	3.2
Max	32	40	5.4	8.6	178	190	0.099	0.96	5.6
Mean ± SD	26±2.3	34±3.5	4.7±.8	7.9±1.2	158±9.5	159.4±9.6	0.090±0.005	0.82±0.05	4.3±0.7

Table 2 Physico-chemical parameters of the pond water in different months at Dhavaleswaram Station-II in 2021-22.

Study Period	Tem	Tr.	DO	pH	TA	TH	NO_2	NO_3	PO_4
Jun. 2021	29	34	5.1	7.5	169	178	0.064	0.44	3.1
Jul. 2021	30	39	5.2	7.6	159	126	0.074	0.56	3.4
Aug. 2021	29	27	5.1	8.1	145	169	0.068	0.62	3.7
Sep. 2021	27	30	5.2	8.3	150	129	0.069	0.56	4.2
Oct. 2021	26	34	4.9	7.7	168	118	0.096	0.78	4.9
Nov. 2021	24	33	5.0	8.8	139	148	0.083	0.53	5.5
Dec. 2021	26	35	4.9	8.3	159	199	0.088	0.70	6.1
Jan. 2022	28	30	4.4	7.6	166	176	0.088	0.92	5.5
Feb. 2022	29	38	4.6	7.7	175	158	0.066	0.68	4.9
Mar. 2022	29	38	4.4	7.5	178	149	0.094	0.73	4.5
Apr. 2022	30	36	5.2	8.4	159	166	0.096	0.91	4.1
May 2022	31	34	5.1	8.6	148	158	0.063	0.73	3.5
Min	24	27	4.8	7.5	139	118	0.063	0.53	3.1
Max	32	39	5.2	7.8	178	199	0.096	0.92	5.5
Mean ± SD	28±	34±	4.9±	8±	159.5±	156±	0.079±	0.68±	4.4±

Table 3 Correlation co-efficient values observed between physico-chemical parameters of water (2021-22) from river Godavari Station- I, Rajahmundry

	Temperature	**Transparency**	**DO**	**pH**	**Alkalinity**	**Hardness**	**Nitrites**	**Nitrates**	**Phosphates**
Temperature	1								
Transparency	.662*	1							
DO	-.162	-.203	1						
pH	-.046	-.378	.557	1					
Alkalinity	.286	.224	-.731**	-.612*	1				
Hardness	-.283	.303	-.423	-.301	.024	1			
Nitrites	-.315	-.361	-.573	-.336	.560	.061	1		
Nitrates	-.357	-.128	-.174	-.494	.420	-.066	.233	1	
Phosphates	-.590*	-.532	-.318	.178	-.076	.297	.509	-.103	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 4 Correlation co-efficient values observed between physico-chemical parameters of water (2021-22) from river Godavari Station- II, Dhavaleswaram

	Temperature	Transparency	DO	pH	Alkalinity	Hardness	Nitrites	Nitrates	Phosphates
Temperature	1								
Transparency	.259	1							
DO	.097	-.151	1						
pH	-.282	-.283	.492	1					
Alkalinity	.248	.547	-.639*	-.830**	1				
Hardness	.084	-.172	-.188	.101	.036	1			
Nitrites	-.363	.198	-.362	-.057	.275	-.046	1		
Nitrates	.182	.029	-.440	-.023	.278	.153	.632*	1	
Phosphates	-.724**	-.034	-.540	.177	.065	.244	.561	.372	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

RESULTS AND DISCUSSION

The average physico-chemical parameters water from River Godavari was recorded from January 2021 to December 2022 and presented Table No: 1& 2 and their correlation were given in Table 3 & 4.

Temperature

Temperature is one of the essential vital environment factors in freshwater ecosystems. It varies not only different geographical regions but also in the same waters during different time and season (Sharma *et al.,* 2000). It is an essential physico-chemical parameter (Rawat and Jakher, 2002). The temperature regulates the self-purification capacity of rivers and reservoirs. Sharma *et al.,* (2000) analyzed that there is a greater influence of temperature on physiology and ecology of fresh water organisms in water bodies at the same time all the living organisms in the water bodies are also influenced by temperature and its effects on biological activities such as, reproduction, metabolism and behavior. Increased temperature may cause increased decomposition of organic matter and impact of season. The temperature suitable for freshwater aquatic organisms are 20 to 30^0C and optimal range was 25 to 28 ^{0}C (Huet, 1971). The optimum temperature can improve the digestive and metabolic enzymes to function effectively so that they will produce energy for growth and survival (Lestari and Dewantoro, 2018). In the present study temperature ranges from 22 to 32^{o}C in Station-I and 24-32 in Station-II. The lowest temperature recorded in the month of December in station-I and November in station-II.

The highest temperature recorded in the month of May in station I and II.

Transparency

Transparency is the vital property of water because of it offers resistance to passage of light. It caused by suspended solids like silica, clay, living or dead algae and other macro and microorganisms. Patra *et al.,* (2010) stated that turbidity is a measure of transparency of water. Expressed maximum values of Turbidity may be due to runoff of water from and heavy rain falls. Rao *et al.,* (2001) expressed that the term 'Turbid' is applied to waters containing suspended matter that interferes with the passage of light through it. Balvay *et al.,* (1990) noted that Turbidity causes threat to aquatic life. During the present study Transparency ranged from 28-40 cm in station-I and 27-39 cm in station-II.

pH:

The pH is considered as negative logarithm of hydrogen ion concentration of water. pH values from 0 to 7 are diminishing acidic, 7 to 14 was alkaline and 7 is neutral. It is controlled the solvent property. In the present study highest pH 8.8 recorded in the month of November in station-II whereas lowest 7.4 pH recorded in the month of June in Station-I. The pH level in the river is optimal to support the survival of aquatic organisms. The seasonal change of pH was mainly due to the rainfall and fresh water inflow. Davis (1954), emphasized that pH is the most important chemical factor of water and it controls the solvent properties. Thus pH is influence alkalinity, CO_2 and many other acid - base

equilibrium (Ahmad and Alireza, 1992). Discharge of sewage from the drains also affects the pH levels water (Mishra *et al*., 2021). In the present study observed that ranged from 7.4 to 8.6 in station-I and 7.5 to 8.8 in station-II in the one year of the study. The Alkaline P^H is as usual parameter of productivity water bodies as noticed earlier by Jain *et al.,* (2000), expressed that the most of freshwater ecosystems have almost neutral P^H.

Dissolved oxygen

Dissolved oxygen is utmost important hydrological parameters of the water that needed to keep the organism alive or dead of the water body in terms of tropic status and biotic status. The oxygen content is needed of many organisms as its affects the solubility and availability of many nutrients of the productivity of ecosystem. In the present study Dissolved oxygen ranges in between 4.0-5.4 mg/l in Station-I and 4.8-5.2 mg/l in Station-II. The highest (5.4 mg/g) D.O recorded in the month of November in Station-I and lowest (4.0 mg/l) recorded in the month of January in station-I. Sahai and Sinha (1976) stated that there is no direct evidence that a short term decrease in Oxygen concentration affects plant distribution. However, longer exposure to low Oxygen concentration may reduce growth, as it was observed that macrophytes were often absent in anaerobic waters (Best, 1982). He further stated that in water with large plant populations considerable daily fluctuations were seen in oxygen concentrations, as a result of changes in the balance between exchange at the water surface, plant photosynthesis, respiration and the oxygen consumption of heterotrophic organisms. The decrease in DO is due to an increase in biological and photosynthetic activities. High pollution loads may also decrease dissolved oxygen value (Bhardwaj, 2005). The DO in the surrounding environment is sometimes referred as the measurement of the pulse of the system (Jayasree, 2002). The low concentration of oxygen can be partly due to low photosynthesis activity (Das Gupta, 1993). It can be due to nutrient enrichment, which leads to high bacterial numbers, bacterial density decomposition, high degree of organic pollution and virtual bacteria (Rawat and Jakher, 2002; Prakasam 2003). The high concentrations of O_2 during certain months may be due to high photosynthetic activity, as water bodies were covered by macrophytes during those months. Pallavi *et al.,* (2003) concluded that the agitation of water during weeding as sometimes the weeding activity was conducted during these months.

Total Alkalinity

The alkalinity of water bodies is primarily a function of carbonate, bicarbonate and hydroxide content and it is taken as an indicator of the concentration of these constituents. The measured values also may include contributions from borates, silicates, Phosphates, or other bases (APHA, 1980). Alkalinity in natural waters is formed due to dissolution of CO_2 in water or HCO_3 produced by the action of ground water on limestone or chalk. Alkalinity provides buffering to resist change in P^H (Tebbut, 1974). Natural water is generally presence of bicarbonates formed in reactions in the soil through which the water percolates and hydroxides. In the present study, the highest alkalinity was 178 mg/L observed in the month of March in both stations, the lowest alkalinity noted was 138 mg/L in the month of November in station-I. Waters with high total alkalinity are not always hard, since the carbonates can be brought into the water in the form of sodium of potassium carbonate (Martin Brunson and Robert Durborow, 2009).

Total Hardness

Water hardness is a traditional measure of the capacity of water precipitate soap and it is caused by dissolved polyvalent metallic ions. In fresh water, the hardness causing ions are calcium and magnesium which precipitate soap. Their role in water hardness may be minimal and difficult to define. Total hardness is defined as the sum of the calcium and magnesium concentration, both expressed as CaCO3, in mg/L. Hardness of water is not a specific constituent but is a variable and complex mixture of cations and anions. The role of water hardness may be difficult to define in confirmatory with the current practices. Total hardness is defined as the sum of calcium and magnesium concentration in mg/L. The lowest value of hardness was 118 mg/L recorded in the month of October in Station-II and highest 199 mg/L recorded in the month of December in station-II. The hardness of water reflects the nature of geological formation, soil profile and catchment area (Krishna et al., 2023; Garg and Garg, 2007). When compared to various standards, the present water samples are well above the permissible limit of WHO (2017). Hardness in water indicates the quality of water mainly in terms of Ca2+ and Mg2+ bicarbonates, chlorides, sulphates and nitrates (Akram and Rehman, 2018).

Nitrites and Nitrates

The nitrites in the river water samples were observed in the range 0.083 to 0.099mg/L in Station-I and 0.063 to 0.096mg/L in Station-II. The nitrates in the river water samples were observed in the range 0.63 to 0.98mg/L in Station-I and 0.53 to 0.92mg/L in Station-II. Highest and lowest levels of Nitrates were noticed during February (0.98 µg/l) in station-I and June (0.53 µg/l) in station-II. The higher concentration of nitrate could be attributed due to the variation in phytoplankton, excretion and oxidation of ammonia and reduction of nitrate (Kannan and Kannan, 1996). The lowest content of nitrate during the month of June was due to less freshwater input, higher salinity also uptake by phytoplankton. The same was recorded by Kannan and Kannan, (1996); Krishna *et al.,* (2023).

Phosphates

Nutrients are considered as one of the most important parameters in the river environment influencing growth, reproduction and metabolic activities of the organism (Saravanakumar, 2008).Of which phosphorous is the important limiting nutrient of the aquatic ecosystem (Wetzel, 1993). Phosphorus is available in the natural waters mostly in inorganic forms such as $H_2PO_4^-$, HPO_4^{-2}, PO_4^{-3}. Meanwhile phosphorus being major constituent of biological systems may also be present in the organic forming. Most of the phosphorus is bound in rocks are generally insoluble in water. The major sources of phosphorus in the aquatic ecosystem are domestic sewage, detergent and industrial wastewater. Trivedy and Goel (1984) stated that pollution causes with high concentration of phosphorus. Similarly the Phosphate content is observed between 3.2 to 5.6 mg/L in station-I and 3.1 to 5.5 in station-II. Phosphates content was also found to high in the months of November to December and lowest recorded in the months of June and July. The phosphate content during winter month was higher and lower in summer months (Meena Sundari *et al.,*

2012). To study the dependency of parameters, matrix of correlation and their systematic study of water quality parameters help to assess the overall water quality.

Water resources are under severe threats from pollution generated by human interventions and inappropriate agricultural and aquaculture drainage from rivers (Krishna et al., 2017, Jin et al., 2020a, 2020b). Anthropogenic sources such as untreated industrial effluents, improperly disposed domestic waste and agricultural runoff are the prime contributors to surface water pollution and water quality deterioration (Uddin and Jeong, 2021). Seasonal variations in both anthropogenic and natural processes such as temperature and precipitation affect the quality of river water and lead to different attributes for different seasons (Krishna et al., 2017). The physical and chemical quality of the lower reaches of the Cimanuk River is influenced by activities in the*;* river such as sand mining, water sources, power plants, industrial raw water, irrigation canals, livestock activities, and fisheries which will affect the value of water quality in the upper reaches of the Cimanuk River (Yustiati *et al.,* 2023). The variation of physico-chemical parameters mainly depends on monsoon rains and also other sources of freshwater. The fluctuations in physico-chemical parameters influence the biological activity and productivity of aquatic organisms. The aim of the present study was to understand distribution of physico-chemical parameters from June, 2021 to May, 2022 and may influence on feeding, breeding and other activities of fishes in the Godavari River area.

References

Ahmed, M. and Alireza Shayestehfer,1992. Diurnal fluctuations in population density of zooplankton from North sagar, Paithan (Maharastra). *Proc. Acad. Envi. Biol*., 1(2): 173-178.

Akram, S. and Rehman, F. U. (2018) Hardness in drinking-water, its sources, its effect on humans and its household treatment. *Journal of chemistry and application*, *4* (1): 1-4 Analysis in the Upper Cimanuk River, Sumedang Regency, West Java Province during

APHA, 1980. Standard methods for the examination of water and waste water, 15th edition. APHA, New York, USA.

Balvay, G., M.Gawler and J.P. Pelletier 1990. Lake trophic status and the development of the clear-water phase in Lake Geneva. In Tlizer M.M. and Serruya (eds.) Large Lakes, Springer Verlag. Berlin, pp: 580-591.

Best Elly P.H. 1982.Effects of water pollution on freshwater submerged
Macrophytes. Water Pollution & Management Review, pp.27-56.

Bhardwaj, R.M. 2005. Water quality monitoring in India achievements and constraints. IWG- *Env. International Work Session on Water Statistics*, Vienna, June 20, 1-12.

Das Gupta, M. 1993. Limnology of two freshwater ponds of Imphal, Manipur. Ind. Jol. of Fisheries, 40(4), pp.256-261.

Davis, C.C., 1954. A Preliminary study of the plankton of the Clevel and Harbor area, Ohio.II. The distribution and quantity of phytoplankton. *Ecol. Monogr*., 24: 321pp.

Diersing, Nancy, May 2009. "Water Quality: Frequently Asked Questions". PDa. NOAA. http://floridakeys.noaa.gov /pdfs/wqfaq/pdf. 2009-08-24.

Garg. J. and Garg, H.K. 2007. Impact of agricultural nutrients and algae diversity. Proc. Nat. Sym. On Biodiversity. 10, 1997.

Huet M. 1971., Textbook of fish culture: Breeding and calcification of fish. Henry Kahn (translate), Surrey: Fishing News:436.

Jain, S.M., Meenakshi Sharma and Ramesh Thakur, 1996. Seasonal variations in physico-chemical parameters of Halali reservoir of Vidisha district, India, J. Ecobiol. 8(3): 181-188.

Jayasree, J. 2002. Quality of water in Parvathy puthanar in Thiruvananthapuram, Indian J. Environ. *Protection* 22(2),188-190.

Jhingran, V. G. 1991. Fish & Fisheries of India. Revised and enlarged 3rd edition. Hindustan Publishing Corporation, New Delhi, India. 125- 128.

Jin, G.Q., Zhang, Z.T., Yang, Y.H., Hu, S.H., Tang, H.W., Barry, D.A., Li, L., 2020a. Mitigation

Johnson, D.L., S.H. Ambrose, T.J. Bassett, M.L. Bowen, D.E. Crummey, J.S. Isaacson, D.N. Johnson, P. Lamb, M. Saul, and Winter-Nelson, A.E. 1997 Meanings of environmental terms. Journal of Environmental Quality 26:581-589.

Kannan, R and Kannan, L. 1996. Physcio –chemical characteristics of sea weeds beds of the palk Bay, Southeast coast of India. *Indian. J. Mar. Sci.,* 25: 358 - 362.

Krishna P.V, Dedeepya P, Sujatha K, Aradhya Sarma B.V.L and K. Durga Rao. 2023. Investigations on Physicochemical parameters of water from Mahendratanaya River, Andhra Pradesh. International Journal of Recent Scientific Research. 14: (07) (B). 3627-3632.

Krishna P.V, K Anil Kumar, Panchakshari V and Prabhavathi K. 2017. Assessment of fluctuations of the physico-chemical parameters of water from Krishna estuarine region, East Coast of India. International Journal of Fisheries and Aquatic Studies. 5(1): 247-252.

Krishna, P.V., R.K. Madhusudhana., K. Sunitha., Prabhavathi, K, 2013. Impact of the habitat distribution and pollution effect on fish faunal diversity of the lake Kolleru, Andhra Pradesh, India. Journal of Bioinfo Environmental and Pollution Vol. 3 (1), pp. 029-031.

Lestari and Dewantoro E. 2018. The Effect of Rearing Media Temperature on Predation Rates and Growth of Dumbo Catfish (*Clarias gariepinus*) Larvae. Ruaya Journal.;6(1):14-22.

Martin W. Bruson and Robert Durborow, 2009. Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. Ronald Brown, Director.

Meena Sundari, P. Senthamil Selvan, K. and Meenambal, T. 2012. A Laboratory study on the physic –chemical characteristics of various surface water bodies in Coimbatore city, Tamil Nadu. *Nature Environment and Pollution Technology; vol:11(4).pp:681 -684.*

Mishra, R., Anand, U., Srivastava, M., Ahmad, S., Suresh, S. and Paliwal, H.B. 2021. Investigation over water quality of River Ganga and Yamuna during Kumbh-2019-A case study at Prayagraj, Uttar Pradesh, India, 1-14.

of impact of a major benzene spill into a river through flow control and in-situ activated carbon absorption. Water Res. 172. https://doi.org/10.1016/j.watres .2020.115489.

Pallavi, Praveen and L.C. Saha 2003. Physico-chemical properties of an oxidation pond. Indian J. Environ and Ecoplan, 7(2), pp: 347-352.

Panchakshari.V; Prabhavathi.K; Krishna. P.V and Srikanth.B. 2015. "The physico-chemical parameters of water from Nizampatnam bay, East Coast of India". *International Journal of Advanced Research,* 3(9): 1259- 1264.

Patra, A.P., Patra, J.K., Mahapatra, N.K., Das, S. and Swain, G.C. 2010. Seasonal Variation in Physico-chemical Parameters of Chilika Lake after Opening of New Mouth near Gabakunda, Orissa, India; World Journal of Fish and Marine Sciences, 2(2): 109-117.

Prakasam, V.R. 2003. Limnological studies on Santhamcotta Lake - A freshwater Ramsan Site. Indian J. Environ and Ecoplan, 7(2), pp: 239-242.

Rao, N. and P.B. Jaya Raju, 2001. Limnological investigations and diversity of plankton in sewage fed fish culture pond at Numbur near Guntur, A.P., Indian. J. Aqua Biol., Vol. 16 (1 & 2), pp: 11-14.

Rawat, M. and G.R. Jakher, 2002. Limno-microbiological studies of few water reservoirs of Jodhpur, Rajasthan. J. Environ and Ecoplan, 6(2), pp: 355-358.

Sahai, R. and Sinha, A.B. 1976. Productivity of submerged macrophytes in polluted and non-polluted regions of the eutrophic lake, Ramgarh (U.P.), in: (C.K. Varsheney, and J. Rzoska Eds.). Aquatic weeds in S.E. Asia., Dr. W. Junk, The Hague, pp: 221-230.

Sharma, H. B., Praveenkumar Agarwal and Sangeeta Probha, 2000. Water quality of sewage drains entering Yamuna River at Mathura (U.P). *J. Environ. Biol*. 21 (4): 375-378.

Tebbut, T.H.Y. 1974. Principles of Water Quality Control, pp: 7-16 the Dry Season. *Asian Journal of Fisheries and Aquatic Research*. 21 (3): 11-17.

Trivedy, R.K. and P.K. Goal, 1984. Chemical and biological methods for water pollution studies. *Envi. Publ*., Karad, India. 122 pp.

Uddin, M.J., Jeong, Y.K., 2021. Urban river pollution in Bangladesh during last 40 years: Potential public health and ecological risk, present policy, and future prospects toward smart water management. Heliyon 7(2), e06107. https:// doi.org/10.1016/j.heliyon.2021.e06107.

Wetzel, R.G., 1983. Limnology, 2nd edition, Saunders Publishing, New York. 753 pp.

World Health Organization (WHO), 2017. Guidelines for Drinking-Water Quality: Fourth Edition Incorporating the First Addendum. World Health Organization, Geneva.

Yustiati.Y, T. Husaeri, T. Herawati and H. Hamdani. 2023. Study of Water Quality

How to cite this article: Krishna. P.V, P.Vara Lakshmi, Dedeepya. P, Aradhya Sarma. B.V.L and K. Durga Rao, 2023. Evaluation on Physicochemical Parameter of Selected Stations from River Godavari, Andhra Pradesh. *Int J Recent Sci Res.* 14(10), pp. 4231-4236.

****