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Limnologycalstudies On River, Godavari, At Bhadrachalam Region, With Reference to Water Quality

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ABSTRACT

Water is the liquid oxygen for life; it is the most indispensable resource for living organisms, in the quick multiplication of this population can subtract the quality of the hydrosphere with industrialisation and globalisation on the horizontal line of the river basin, the actual availability of fresh water is 0.3% is accessible on surface water bodies, rivers are important for the development of culture along with the civilizations. Assertive metals were noticed at the point source of paper mill in the Godavari River the relation and distribution can have been some fluctuations on seasonal effects the concentrations were explained in the order of ascending manner a methodical study can understand the water quality of river Godavari at bhadrachalam region for the reference of water quality as it were some metals are indicate the escalation in the concentration along with other effective physico -chemical parameters in the water frequently like chlorides ,sulphides along with total hardness and alkalinity. Some other important metals can promote the algal species at permissible limits.

Keywords : Godavari River, physico-chemical parameter, water quality, Human health

I. INTRODUCTION

Water is the legendary element all of five panchabuthas, even so in this rapidly developing computer era our 3% of fresh water get polluted which is available in rivers and ground, the portability of the water positively laid on the permissible limits of physico-chemical parameters. The healthy percentage of parameters are truly depends on the composition of the rocks and soil at unsaturated zone (Dr.Potadar Vishnu and Rahul Gade .2021) and the surface water mainly get polluted due to globalisation, industrialisation and also fallowed by part of more alternative activities means removing the green layer and adding of domestic waste and industrial waste in to surface water bodies

(kharake and Raut 2021).these activities are hugely concentrated at urban areas ,the percentage of increasing urban pollution by approximately up to 6% at the decade of 2050.some metals including heavy metals are necessary for the living aquatic organisms at little amount known as micro metals for various metabolic process ((Whitton and Say 1975).some metals has been added in to the river water by agriculture pesticides, herbicides along with other potential toxicants(Manikya reddy and Venkateswarlu.1985)which can gradually experience the break down even so some metals are from sediments and effect the water quality and aquatic organisms. since from last few decades it will put pressure on the river rein net work, (Bora and gowswami .2017) In nature, the presence of these metals depends on various environmental conditions. The principal sources of heavy metals have been dealt at length by Williams et al (1974). Previous studies have shown higher concentrations of these metals associated with the growth of industrialisation though it is difficult to generalise in view of the differences with the type of industry and specific operation.

Ajay D .et.,al(2010) the same product may result in different amounts of metals being contributed to aquatic environment .water has loss the dilatation capacity to dissolve organic and inorganic compounds. so many other developmental and entrainment activities are pollute the rivers from many other ways. Various auxiliary countries are focussed on well economic and sustainable growth for the reclaim of surface water bodies. As a consequence of globalisation and industrialisation water bodies are become pollutant bodies Bhagya Lakshmi et.,al(2010)Water pollution not only effect the physico –chemical and biological parameters it s also effect the human life's directly and indirectly D.M. Joshi et.,al (2009) , Jakir Hussain et.,al(2017) along with socio –economic development and prosperity it leads to reduction of water quality (Das.2013).The present paper survey on the effluents from Bhadrachalam paper mills at Bhadradri kothagudem district. At point source channel in to river Godavari. Attentiveness on focal point physico-chemical parameters and effects. On aquatic life and human life. Ravi Babu B and P Padmavathi(2014), Shaheda Niloufer et.,al (2019).

II. MATERIALS AND METHODS

The river Godavari is the Pranadatha for Maharashtra population not only for the Maharashtra region it is also give life to more population with the stretch of 1.465 kms it associate with bay of Bengal at Antherwedi at the region of east Godavari, in Andhra Pradesh. While passing on the way the river Godavari polluted at bhadrachalam region by receiving the harmful discharges from bhadrachalam paper mills. At this region we select three sampling stations, Station I is located at the right side at point source of the River Godavari, This station gets polluted due to anthropogenic activities. Station II is located at the left side of the River near water purification centre, which is used for drinking water for bhadrachalam population. Station III is located 200 meters after station II, nearby Ramalayam Snanala ghat. The effluent channel from BPL which runs for 3 km through the village Sarapaka, at this region water is dominantly polluted along with thick orange colour with foul smell along the period of investigation. The surface water samples were collected from the three sampling stations every month in polythene cans for 2 years from December 2017 to November2019. The water samples were collected in fresh 1000ml plastic bottles ,were closed gently along with well labelling by following the time accordingly carried out in to the laboratory and stored at 4^c for further analysis. From the collected samples we separate 250 ml of water in to glass bottles (BOD bottles) for the estimation biological oxygen Demand. The water temperature was recorded at site as a consequence of thermometer.

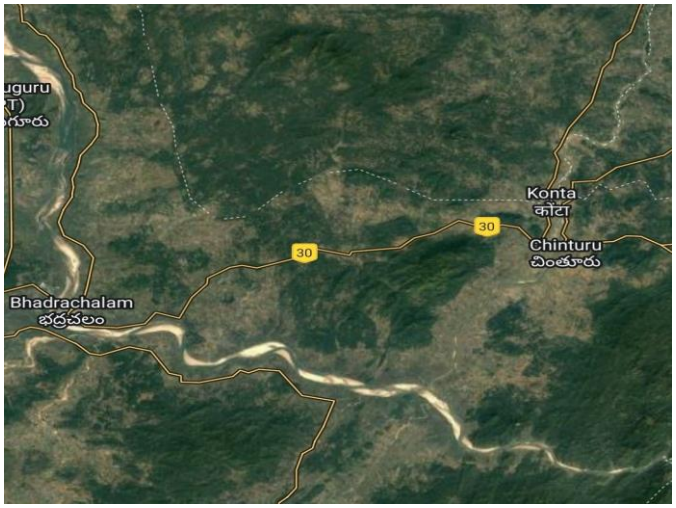

Fig 1. showing the satellite image of river Godavari at Bhadradri kothagudem, District.

The pH is the primary physico-chemical parameter we determine it by using digital pH meter. We follow Wrinkler's method for the determination of dissolved oxygen (DO).Alkalinity and chlorides were estimated by titration methods suggested by (APHA-2005),and TDS were estimated by as a consequences of (APHA-2005).and finally hardness of water estimated by using EDTA method.

III. RESULTS

The current analysis was discussed about physico-chemical parameters, the analysed parameters were have been tabulated in the table-1.developed the demand on limited resources, lack of general awareness on water pollution has led to public debate about the environmental effects.

(Potadaret al., 2021).during this period of study the temperature between24.3 C to 31.3 C. the minimum temperature were recorded at sample station-I on in the week of December, month.

In the wake of low atmospheric temperatures. The maximum temperatures are 31.3C were recorded due temperatures, together with the high production of paper along with high amount of pulp cleaning and also with bleaching, at the suitable conditions of temperature in the summer. Including atmospheric gases from water. The high temperatures can show footprint for highly polluted water and also affect to the hydro health. On the other hand the concentration of hydrogen oxygen (Ph) in the water body cans a command the aquatic health directly along with unreasonable concentrations of other destructive chemicals. And also affect the soil health at the surrounding area of the river M. M. Sarin et.,al.(2016).the minimum pH values are noticed at the sampling station –I with7.7 in the month of January-2019.and the maximum range of pH with 11.2 at sampling station –I. with the consequence of present studies sampling station-i encounter with elevated alkalinity when compared with sampling station-ii, and sampling station-iii, in these categories station –ii with second place along with station –iii with least place with moderate alkalinity. The increased concentrations of hydrogen ions in the water with the cause of biological activities and drastic changes in the water temperatures. (Gupta, D.P., Sunita and Saharan, J.P. 2009) According to the standard values of the world health organisation 6.5 to 8.5 is computable for the aquatic life. The increased pH values are preferably highlighted the other advisable diluted chemicals (TDS) in the water body by the means of bicarbonates, carbonates, potassium, calcium, and sulphates. The values increased values of the TDS indirectly based on the soil health and also quality of the igneous and metamorphic rocks in and around the catchment area.

Table 1

COMPARISON OF THE PRESENT DATA WITH ISI AND WHO STANDARDS

S.NO	Parameter	Station-I	Station-II	Station-III	ISI-1991	WHO-1971
1	pH	9.6	8.8	8.6	6.5-8.5	6.5-8.5
2	CO_3^{2-}	74.08	38.84	40.42	-	-
3	HCO_3^-	266.21	253.44	259.7	-	-
4	Cl-	409.25	357.09	364.91	-	250mg/l
5	DO	1.97	1.45	1.12	6mg/l	3mg/l
6	OM	38	32.08	32	-	-
7	TH	455.7	378.38	337.41	300mg/l	300mg/l
8	Ca^{2+}	225.93	434.67	294.98	200mg/l	75mg/l
9	Mg^{2+}	23.55	21.025	16.84	75mg/l	30mg/l
10	PO_4^{3}	1.18	1.03	1.08	-	-
11	NO_3^-	0.32	0.3	0.25	-	-
12	NO_3^-	6.07	6.5	5.9	45mg/l	-
13	SO_4^{2-}	53.66	51.91	49	200mg/l	150mg/l

During this investigation it was observed that the maximum and minimum amount of carbonates and bicarbonates in between 28.5 to 91.2mg/L respectively at station-III and station-I, at the point source of paper mill we noticed that the high carbonate values observed while flowing the river at station-II, III the values are decreased. The increased percentage of carbonates in water to add the hardness to water. During the study period we noticed that chloride values are above the permissible limits in the river Godavari at all three stations respectively with 406.25, mg/L 357.09, mg/L and 364.91mg/L. the increased concentrations in the chloride values can indicate sever sewage pollution in the river and also effect the bone health in the humans along with plumbing erosion in the pipeline system. In this case of investigation we observed that the dissolved oxygen levels are below the permissible limits (3mg/L) in all three station respectively but at station-I it's is high when compare with other two stations, with the values of 1.97.mg/L - 1.45mg/L along with 1.12mg/L. The low dissolved values in the river can increase the stress on aquatic life and creates hypoxic conditions. The good dissolved oxygen levels can give the good taste to the water. On the other hand we calculated the total hardness with WHO permissible limits; we observe our values are cross the permissible limits with the indication of water pollution, the maximum and minimum values of total hardness are in between337.41mg/L to 455.7mg/L the higher values are observed at station –I, increased levels of total hardness can indicate the increased concentrations of carbonates and bicarbonates. The calcium levels are also high compare with permissible level of healthy organisations, these values are starched in between 225.93mg/L to 464.68mg/L low levels of calcium at station-i dominated values at station-ii with these values water get hardness, it's not create any serious effects to the health of humans immediately but slowly its responsible for the cardiovascular disease. In some areas ground water also getting hardness to add the more calcium and magnesium ions from the different types of limestone along with micro nutrients like iron and manganese from the soil.

The other important nutrient in the water quality is magnesium; in the current examination we show the values of magnesium in the Godavari River are expandable with the comparison of standards methods of world health organisation (WHO) and ISI. The low magnesium values are recorded at station –III along with increased magnesium values observed at station-I, the increased level of magnesium can cause the hardness of the water and slowly its indirectly effect the human health along with aquatic life's. the other essential nutrients in the water are nitrite is the most frequent pollutant in the rural areas the high concentrations of nitrate in the drinking water can cause serious health effects in the humans namely blue baby syndrome are also called methamoglobinaemia in the infants the main source of nitrates is agricultural pollution means pesticides, fertilizers can reach the water body with runway of rain water frequently. and the main source of sulphates pollution are taken out from the pulp industry and textile industry in these explanation we point out that both the nitrates and sulphate values are below the basic line of the boarded limits the standard organisations at station-III with5.9, mg/L station-I with 6.05,mg/L station-III with 6.9mg/L of

nitrate values, the sulphate values are 49, 51.mg/L and 53.66mg/L respectively. The low concentrations of nitrogen can cause oxygen depilation then the aquatic organism can depend on the supply of oxygen. The high amount of sulphate concentrations can develop the asthmatic symptoms, and lung diseases.

IV. CONCLUSION AND FUTURE SCOPE

The rivers are the basic element for the growth development in the wing of ecologically and socioeconomically. In the current analysis of physico-chemical parameters were accomplish. An attentive and scientific work was carried out for the analysis of physico-chemical parameters. in these we found that the average Temperature was 31.2^0C, pH was - 8.5.Carbohydrates (36.5) mg/L bicarbonates (51.2), mg/L Total hardness (36.78) mg/L calcium (197.1), mg/L, Magnesium (19.2).mg/L, Sulphates (37.1) mg/L. Based on these investigation we conclude that the river Godavari water is not preferable for direct consumption, proper water treatment is required for the purification of river water at bhadrachalam region. On the other hand proper treatment is suggested to paper mill before discharge the waste water into river Godavari.

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