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Physico-Chemical Analysis And Seasonal Variation Of Surface Water Sample From Kartala Area, District Korba (C.G.) India.

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ABSTRACT :- The present paper deals the seasonal variation in some important physico-chemical parameters of Kartala area,Korba District . A total of six parameters were recorded during the study period. Standard methods were used to analyzed the parameters. Sample water have been collected during the pre-monsoon, monsoon and post monsoon season. Water sample collected from selected study area showed a high value in all parameters in pre-monsoon season, while in monsoon and post monsoon season showed all parameters relatively low. This may be due to the reduction of overland flow with rain water. And all the parameters in monsoon and post monsoon season remain under permissible limit. It was noted that the water body that was receiving the pollutants looked like an aquatic desert, which is extremely inappropriate for forming and aquatic biota.

KEYWORDS:-Seasonal variation,physico-chemical parameters,Pollutants, permissible limit.

INTRODUCTION

A successful civilization can be developed with the help of water it is the most abundant and vital substance on the planet (Ghosh BB, Basu AK, 1968). Water is the natural resource that is employed for a verity of residential, industrial and agricultural uses. Just a tiny percentage of the water on earth is fresh water; the majority is saltwater. Knowing the water quality can be achieved through is studying Physico-Chemical factors. According to WHO a studying, in 2030, over 50% of developing countries may not have enough water, which would cause 80% of people to experience diseases caused by water. India currently has70% polluted water. Water-borne in illnesses like cholera, dysentery, poliomyelitis and typhoid are caused by domestic sewage that leaks from homes, endangering public health and degrading water quality.

An important aspect of any aquatic ecosystem's water resource is its interaction with surroundings Which may be understood through studying the water quality (WQ) of the body of water (Pfumbidzai, 2014).

The Physico-Chemical characteristics of the water are essential to the survival and flourishing of aquatic life (Dixit, 2015). Water contamination of the source of numerous ailments that have linked to human health. The transmission of water-borne diseases happens when contaminated water is consumed,washed, or bathed in while detrimental effects on the country, it is imperative that the quality of the water be periodically monitored. Currently, emerging nations across the globe are facing a big issue. This study's primary goal was to provide an estimate of the Physico- Chemical features of pond water contamination. In light of the financial losses resulting fromwater-borne illness. The most annoying issues we are now dealing with is environmental degradation. The three main resources for a biological system are soil, water, and air. In the past they were unadulterated, pure and healthy; however, due to globalization, things have completely changed, endangering human health and the environment. The primary cause of environmental contamination is anthropogenic activity directed towards the natural world (Black, 2005). In India ponds have been used as a traditional source of water. Ponds are categorizes into artificial or natural water body. Ponds with fresh water are among the most vital sources water for life. These ponds hold rainwater that is used for domestic or communal purpose throughout the rainy season. It is vital to examine the water quality because animal mostly use it for drinking. Both extensive biodiversity and human survival depend on ecological balance (Verma , 2017). Ponds are generally < 2 hectares in size, shallow (< 3 m), and dominated by aquatic plants. Ponds have become eutrophic due to the uncontrolled release of homes waste water into them (Pandey and Pandey, 2003). The present study involves the analysis of Physico-Chemical parameters of ponds water from Kartala area, district Korba .The objective of the present study is to estimating the Seasonal Variation of various Physico-Chemical parameters like pH, Temperature, Total Dissolved Solids, Total Suspended Solids, Total Solids, Electrical conductivity.

MATERIAL AND METHODS

Study area

The study area was kartala AREA, DISTRICT KORBA , India) Korba, situated at coordinates 22.35°N 82.68°E,[3] boasts an average elevation of 252 m (827 ft).

According to the 2011 India census,[4] the population of Korba city was recorded at 365,253.

This city is a constituent of the Korba District, established on 25 May 1998. Encompassing an expansive forest area of 4,187.375 km2 (1,616.755 sq mi), Korba is home to 17 police stations and comprises five blocks.Latitude and longitude coordinates are: 22.301697, 82.956879. Kartala is a block village in central Chhattisgarh, situated in the district of Korba. There is a great number of small settlements like that in the

area. Villages and small towns in this part of the state survive with the help of small farms and selling agricultural products to various kinds of clients.

Sample Collection

Water sample from pond was collected in summer, rainy and winter season. Samples were collected at morning time in sterile containers with a capacity of 1 L. The Water samples were immediately brought in to Laboratory for the Estimation of various Physico-chemical parameters. The physical parameters and Chemical parameters were determined by standard methods were determined in the laboratory as per the standard method (APHA, 2005). All chemicals used were of A.R. grade and double distilled water was used throughout this study.

Table 1 :- Standard Values of Drinking Water (BIS: 10500-1991)

S. N.	PARAMETERS	MINIMUM VALUES	MAXIMUM VALUES
1.	Temperature	-	-
2.	pH	6.5-8.5	No relaxation
3.	Electrical conductivity (EC)	-	-
4.	Total solids (TS)	-	-
5.	Total Dissolved solids (TDS)	500	2000
6.	Total Suspended Solids (TSS)	-	-

Table 2 : Standard method used for some physic-chemical parameters and their effects on Organisms.

S.No.	PARAMETER	METHOD	UNIT	POTENTIALHEALTH EFFECTS ON ORGANISMS	USPH
1.	Temperature	Thermometer	o C	Fishes behaviour, breeding cycles	-
2.	PH	pH Meter	-	Decrease reproduction	6.0 -8.5
3.	Electrical conductivity	Conductivity meter	mhos /cm	Seriously sick or die	300
4.	Total solids	Digital conductivity meter	ppm	Clog fish gills, stress	-
5.	Total dissolve solids	Digital conductivity meter	ppm	Growth inhibit, respiration problem	500
6.	Total suspended solid	Digital conductivity meter	ppm	Rotting aquatic plants	100

RESULTS AND DISSCUSSION

The Physico-Chemical parameters values of waters are given in Table 3 and figure 1. The Physico-Chemical parameters are given above, and compared with BIS Standards values in table 1 (Marisol Vega, Rafael Pardo, Enrique Barrado, Luis Deban).

1.**Temperature** :- During the study period water temperature varied from16.5 to 36.6oC. The maximum temperature (36.6°C) was observed during the Pre-Monsoon season and minimum temperature (16.5°C) was observed during the Post-Monsoon. Jayabhaye et al. 2005, and Salve and Hiware, 2006, observed that during summer, water temperature was high due to low water level and clear atmosphere.

While it is impossible to regulate the temperature in a pond, aquatic life adjusts its body temperature to suit its surroundings and reacts quickly to temperature changes.

2. **pH**:- It measures acidity (hydrogen ions) or alkalinity of the water and ranges from 6.62 to 7.3. The higher value of pH found in the Pre-Monsoon, while the lower value found in Post-Monsoon. Fish with increased mucus on their gill surfaces, odd swimming behaviour, fin fraying, damage to the eye lens, and poor phytoplankton and zooplankton development are some of the signs of low pH (Awofolaju, Ogbeide, & Adebayo, 2019). Optimal pH levels in the pond should be in the range of 7.5 to 8.5. However, very little high pH value (6.6) was observed during the monsoon season due to the dilution of ions due to rain. pH ranging between 5.0 and 8.5 is best for plank tonic growth (Dixit, 2015).

3. **Electrical conductivity(EC)** :- EC in the water of the pond analysed during the study period has been found to be fluctuating between 408.1 to 479.4 mho/cm. The highest value observed in Pre-Monsoon and lowest value observed in Post-Monsoon season. Kashyap 2016, analysed the Ramnai (Rewa Rural) drinking water for EC and reported that 180 mho/cm.

4. **Total solids (TS)** :- The total solids value obtained in this study was 146 mg/L to 383 mg/L. in which the highest value observed in Pre-Monsoon season and lowest value observed in post monsoon season. However the value in monsoon season (165 mg/L) little bit higher than the post-monsoon season.

5. **Total dissolved solids (TDS)** :- During the present study, the TDS wavered from 85.4 mg/L to 97.9 mg/L. The higher value of total dissolved solids found in the Pre-Monsoon (97.9 mg/L) and lower value found during Monsoon season (85.4 mg/L). Total Dissolved Solids of the drinking water is 500 mg/L [BIS]. High TDS resulting from the ions K+, Cl-, and Na+ being present. It is also possible to dissolve toxic ions like arsenic, cadmium, etc. in water, which could be dangerous.

6. **Total suspended solids (TSS)** :- Total suspended solids in water can be trapped by a filter (Surapati & Mizwar, 2020). T.S. S. include silt, rotting plant, and animal debris, as well as industrial waste and sewage (Gangwar, Singh, Singh, & Singh, 2013). High quantities of suspended particles can harm stream health and aquatic life in various ways (Crosa, Castelli, Gentili, & Espa, 2010). Total suspended solids (T.S.S.) were found to be highest in Pre-Monsoon (82mg/L) and minimum in Post-Monsoon (73.9mg/L), respectively. The amount of total solids, suspended solids, and dissolved solids present in the pond water is also depending upon the amount of domestic waste water are discharged into the pond (Dey et al., 2021) the total suspended solids range observed between 73.9 mg/L to 82 mg/L.

Table 3 :- **Physico-Chemical Parameter Analysis of Water Samples in Kartala area, District Korba.**

S.N.	PARAMETERS	PRE-MONSOON	MONSOON	POST-MONSOON
1.	Temperature	36.6	26.7	16.5
2.	pH	7.3	6.9	6.62
3.	Electrical Conductivity	479.4	454.3	408.1
4.	Total solids	383	165	146
5.	Total Dissolved solids	97.9	85.4	97.2
6.	Total suspended solids	82	78.4	73.9

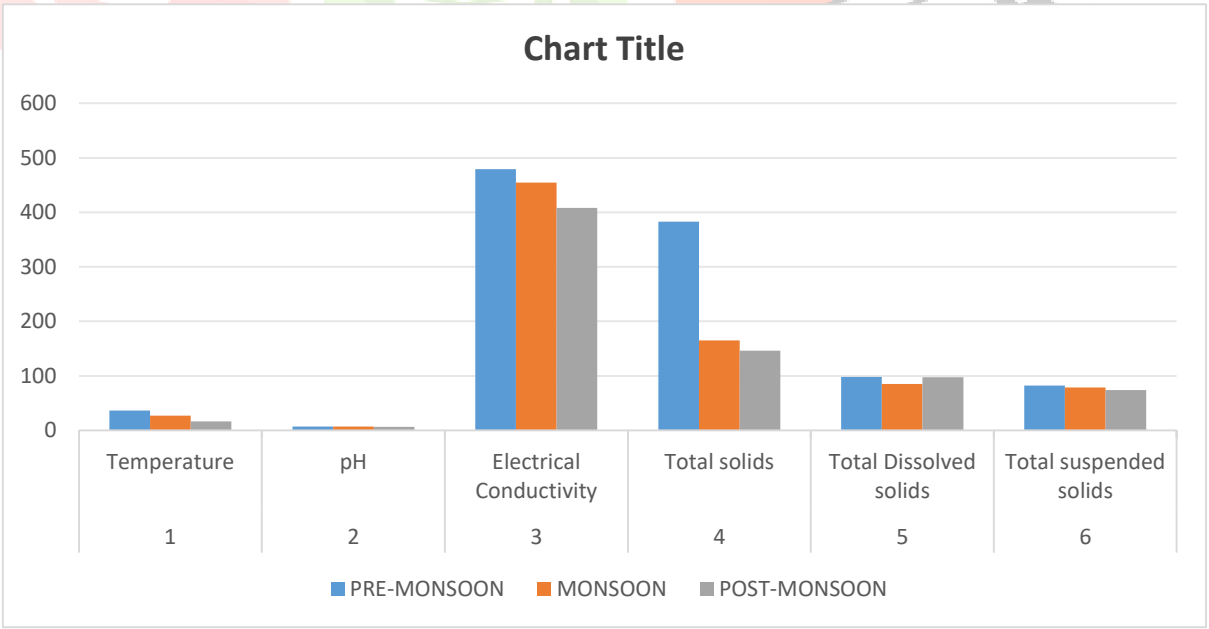

Fig 1 Graphical Representation of Physico-Chemical Analysis of Water Samples in Kartala Area, District Korba .

CONCLUSION

A study of Physico-chemical parameters of pond of Kartala Area, District Korba , was carried out by taking convinced important parameters like temperature, pH, EC, Total Solids, Total Dissolved Solids, and Total Suspended Solids. Each water parameter alone may not tell much, but several parameters together can reveal dynamic processes taking place in the pond. Water quality records will allow farmers to note changes and make decisions fast to take corrective actions quickly. In the present study, pH noted during pre-monsoon, monsoon, and post-monsoon were within the tolerance limits (6.0 to 8.5) depending on various water uses (ISI-IS: 2296–1982), and the value of TS, TSS, TDS were also within the permissible limits. The value of EC was crossover the permissible limit. Climatic variation cannot cause major changes in the pond water. To tolerate the ecosystem and aquatic life in the pond water, there should be awareness programs related to the protection of the pond so that aquatic life is saved in the future. Careful monitoring of water quality parameters is important to understand the quality of pond water. The Physico-Chemical characteristics of pond water suggested that there was harmful to pisiculture, irrigation and drinking water.This document also presents the findings of a study on the water quality parameters in Kartala Block, Korba District, Chhattisgarh. Korba, a vital industrial hub in India, is characterized by extensive coal reserves, numerous thermal power plants, and significant industrial operations. The region's environmental health, particularly its water resources, is crucial given its industrial intensity and the presence of protected tribal communities.The rapid industrialization in Korba, while contributing significantly to the national economy, poses considerable challenges to its natural resources, particularly water. The operation of numerous thermal power plants and the largest open-cast coal mine inevitably leads to the generation of industrial waste and pollutants.These pollutants, if not properly managed, can leach into groundwater and surface water sources, leading to contamination. The long-term effects of such contamination can include adverse impacts on aquatic life, soil quality, and the health of communities relying on these water sources for drinking and agriculture.Moving forward, continuous monitoring, stringent regulatory enforcement, and the adoption of cleaner industrial technologies are vital. Collaborative efforts between government agencies, industries, and local communities will be key to balancing industrial development with environmental protection, ensuring a healthy future for Korba's water resources and its people.

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