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LIMNOLOGICAL STUDIES ON SELECTED RESERVOIR OF WANAPARTHY DISTRICT, TELANGANA STATE

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ABSTRACT

The present investigation was conducted to analysis the physico-chemical factors of fresh water reserervoir of Wanaparthi District, Telangana State. The key parameters of water quality such as temperature, pH, DO, alkalinity, chloride, hardness, nitrates and phosphates were studied for the period of one year (Feb 2024- Jan 2025). The results indicate that, the reservoir water exhibited seasonal oscillations in the physico-chemical parameters and all concentrations of parameters are within the permissible limits.

Keywords: Reservoir, Ramanpad, Physico-chemical parameters, Aquatic ecosystem.

INTRODUCTION:

Fresh waters resources are the only source for agricultural, domestic and other developmental needs of human society. The unforeseenddevelopment of human civilization, fastindustrial development and usage of haphazard chemicals are damaging the aquatic environment including reservoirs and lakes. Which affect the life of aquatic life (Rajashekhar et al., 2010). Understanding such ecosystems and their eco-physiology entails sound information not just for organism which lives in aquatic ecosystems but also of those of other external factors influences the various other ecological equilibrium (Sahni &Yadav, 2012and Ramalingappa et. al., 2015)

Water quality is foremost limiting factor in any aquatic ecosystem including reservoir. Several workers are reported the dynamic changes in various physical and chemical factors of freshwater resources and their ecological status (Amte et al., 2005; Patel & Patel, 2012; Punitha & Selvarajan et al., 2020).

In the present investigation, an attempt has been made to analyses the physico-chemical factors of fresh water reservoir of Wanaparthi district, Telangana state. The study was conducted to reveal the physicochemical characterization water and their variations with reference to the different seasons.

Materials and Methods

Water samples were collected from different stations of the reservoir for the period of one year from February 2024 to January 2025 between 9.00am- 11.00am. All water parameters were analyzed for according to slandered procedures of APHA (2012).

RESULT AND DISCUSSION

The monthly variations of physicochemical parameters of Ramanpad reservoir are depicted in Table No.1 .

Table 1: Physico-Chemical parameters of Ramanapad reservoir.

Months	Summer season	Southwest Monsoon season	Northeast Monsoon season
Temperature °C	26.98 ±0.52	24.32±0.41	28.45±0.12
pH	7.32	7.82	8.23
Chloride (mg/l)	2.65±0.84	3.52±1.54	4.28±1.14
Hardness (mg/l)	12.15±2.74	19.56±1.83	17.24±2.17
Dissolved Oxygen (mg/l)	4.52±0.54	6.85±0.26	5.2±0.65
Free CO ₂ (mg/l)	11.23±1.24	12.32±1.54	11.78±0.58
Alkalinity (mg/l)	78.54±12.23	89.56±14.23	99.65±18.74
Phosphate (mg/l)	1.75±0.52	3.25±0.82	2.12±0.21
Nitrate (mg/l)	8.25±0.23	9.56±0.56	12.43±0.61

Temperature:

The seasonal variations of water temperature of reservoir ranged between 24.32±0.41 °C to 28.45±0.12°C. The changes in climate of the study area is main reason for fluctuation of water temperature. The maximum values were recorded during northeast monsoon season and low values were recorded during summer season.

Hydrogen Ion concentration:

During the study period, the pH values are varied between 7.32 to 8.23. according to several researchers (Murdoch et al., 1996), 6.5 to 8.2 is the optimal pH range for growth and development of aquatic biota. The present values indicate that, the reservoir water is slightly alkaline condition and support high diversity of life.

Chloride:

Chloride is one of key chemical factors in aquatic ecosystem and it variations may have impact on life of aquatic ecosystem. The present study reveals that, high values of chloride content was noticed during northeast monsoon season and low values are observed during summer season. Similar results are reported by Gayathri et al., (2011).

Hardness:

Hardness is combination of bicarbonates, carbonates, cat ions and anions,. The higher values of hardness were found during southwest monsoon (19.56±1.83 mg/l) and minimum

during summer season (12.15 ± 2.74 mg/l). Similar reports were made by Jadhav and Prajapati (2011), Harney et al. (2012) and Sharma and Tiwari (2018).

Dissolved oxygen:

Dissolved oxygen plays key parameters and play an significant role in survival of life in aquatic medium. According to report of WHO (1993) 4.0 mg/l to 7.0 mg/l of dissolved oxygen as optimum for aquatic ecosystems particularly freshwater ecosystems. While Dissolved oxygen less than 2.5 mg/l is leads to hypoxic condition of aquatic ecosystem. During the study period, the values of dissolved oxygen recorded was observed between 4.52 ± 0.54 mg/L to 6.85 ± 0.26 mg/L in Ramanpad reservoir. The low concentration of dissolved oxygen associated with organic pollution and other such oxidisable substances (Ara et al., 2003). The high values of Dissolved oxygen were noticed during Southwest monsoon season and low values were recorded during summer season.

Free CO₂ (mg/l):

Free Carbon Dioxide is result of respiration and decomposition of aquatic biota and is the important source of carbon dioxide. It is the end product of organic carbon degradation. During this study period, the free carbon dioxide concentration was between 11.23 ± 1.24 mg/l to 12.32 ± 1.54 mg/l respectively. The high values were recorded during southwest monsoon, followed by Northeast monsoon season and low values were recorded during summers season. Increase the concentration of free Carbon dioxide level during monsoon indicates its influx through rainwater in the form of carbonic (Raj and Sevarkodiyone, 2018). The observations of the present study are in conformity with the earlier findings reported by Rajashekar et al., (2018).

Alkalinity:

Alkalinity of water is considered to be its ability to neutralize acids concentrations. The different biological activities of aquatic fauna may be reason for proportion presence of carbonates and bicarbonates in the aquatic ecosystem (Jadhav and Prajapati 2011). During this study period the alkalinity concentration between was 78.54 ± 12.23 (Summer season) to 99.65 ± 18.74 (Northeast Monsoon season). the present findings are within the desirable level of alkalinity. Similar results were reported by Das and Chand (2003), Manjare et al. (2010) and Jadhav and Prajapati (2011).

Phosphate:

Decomposition of organisms and weathering of soundings of water body is the main source for availability of phosphate. The present study reveals that, the concentration of phosphate level was between 1.75 ± 0.52 (Summer season) to 3.25 ± 0.82 (Southwest monsoon season) respectively. Low concentration of phosphate content during summer season can support the high growth of algal community, while high phosphate values in the southwest monsoon may be attributed to inflow organic water in the reservoir along with rainwater from surroundings areas. Our outcomes are in agreement with findings of Desai (2015) and SnehaRashmi (2016). (Mendonsa and Vishnuprasad, 2019).

Nitrate:

The natural phenomena of biological oxidation of nitrogenous organic substances produces nitrate content in freshwater aquatic systems. According to SnehaRashmi (2016), the high concentration (5 mg/l) of Nitrate levels in natural aquatic ecosystems waters considered to be pollution (Singh et al., 2009; Patra, et al., 2010). The present study reveals that, the high values of Nitrate content was observed during Northeast monsoon season, while low values are noticed during summer season. . Similar observation was reported by Mishra et al. (2014) and Ramesh and Selvanagam (2013).

CONCLUSION:

The present investigation, physicochemical characters of reservoir showed considerable seasonal fluctuation. All the parameters of water of reservoir are within acceptable limits, these concentration of various physicochemical properties of ecosystems can support the stability and quality, maintains the good primary productivity.

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