Anthropogenic Manipulation Impact on water quality parameters from Hipparaga Talav (Ekruk Lake) from Solapur, Maharashtra.

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Abstract: The present investigation was carried out on physicochemical parameters of Ekruk tank during October 2011 – September 2012. The present study focuses fluctuations occurring in physicochemical parameters of tank. Water samples were collected from selective study sites and analysed for various physicochemical parameters including temperature, pH, DO, BOD and COD. The results showed seasonality as well as human activities influenced trends occurring in physichochemical parameters of this tank. Physicochemical parameters are found in permissible limits of ISI during present investigation.

Key Words: Physiochemical Parameters, Water quality.

Introduction:

Water is a universal solvent. It has capacity to dissolve many substances including organic and inorganic compounds. The quality of water generally refers to the components of water present at the optimum level for suitable growth of plants and animals. The quality parameters include temperature, turbidity, nutrients, hardness, alkalinity, dissolved oxygen, biological oxygen demand etc. There are some of the important factors that determine the growth of living organisms in the water body. The aquatic animals mainly suffers because pollution of lake water. Due to water pollution, the physical and chemical nature of water showed drastic and undesirable changes making it unfit for drinking purpose as well as other uses. Water quality assessment concerned with analysis of physical and biological factors which will define overall trophic status of water body. Now a days due to various anthropogenic activities has pronounced influence on different physicochemical parameters of this lake.

Ekruk tank is a freshwater tank representing lentic ecosystem.Water from this tank is utilized for drinking purpose for some parts of Solapur city and surrounding villages. Apart from drinking, water from this lake is also utilized for agricultural, washing, fishing purposes.

The attempt of the present study is to analyse the water quality parameters of Ekruk tank, Solapur.

Materials and methods:

Study area: Ekruk tank is located near Solapur City. . Ekruk tank is the main artificial lake in this town. Ekruk tank comprise a reservoir formed by an earthen dam 7200 feet long and seventy two feet in greatest height and three canals. The lake is sixty feet deep, when gets occupied it holds 3,350 millions of cubic feet. The area of water surface is about 4,640 acres or 7 ¼ square miles.(Gazette of Solapur) (The experiment was carried out during October 2011- September 2012. Ekruk tank is artificial lake located in Solapur (MS), India. Water from this lake is utilized for drinking purpose. The human activities such as dhobi ghat, washing of cattles and vehicles are responsible for pollution of this tank. Therefore, checking water quality parameters is very important.

Collection of water sample: The water samples were collected season wise and analysis of temperature, pH, dissolved oxygen, biological oxygen demand, and chemical oxygen demand was carried out. For the laboratory analysis of physico chemical parameters standard material and methods referred from APHA(2005) and Trivedi and Goel.(1986).

RESULTS AND DISCUSSION

The results from various physicochemical parameters are presented in Graph No 1.

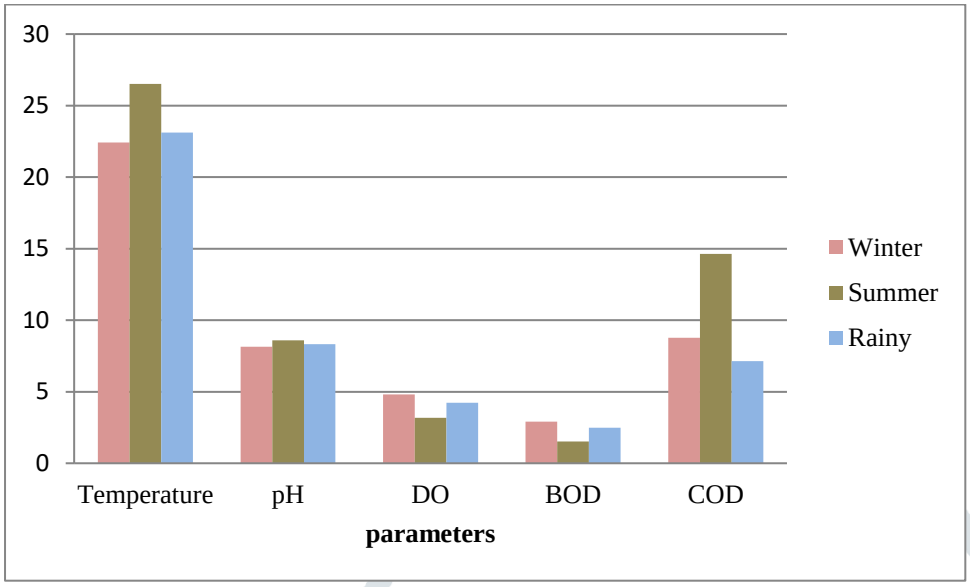

Fig: Season wise water quality parameters

The potability of water is mainly depending upon amount of physicochemical parameters found in the water. Any variations in standard directly affect the quality of water and thereby influencing distribution and existence of aquatic life. In the present work, the analysis of physicochemical parameters of water revealed changes according to season. The temperature showed changes according to seasons. During winter, the recorded temperature was 22.43 ± 0.5 ^{0}C. In summer it was increased up to 26.52 ± 0.40 ^{0}C whereas rainy season showed decline in water temperature up to 23.11 ± 0.5 ^{0}C. Similar observations were recorded by Shinde *et al.,* (2010). They recorded rise in water temperature during summer season due to the overall increase in atmospheric temperature. Smaller water bodies react quickly with the change in temperature (Welch 1952).

pH showed little variation in different seasons with maximum value during summer (8.59 ± 0.25) followed by rainy (8.32 ± 0.10) and winter (8.14 ±0.15).Ali (2009) recorded seasonal changes in pH value between 6.3 to 8. According to environmental protection energy (1972) aquatic animals are adapted to average pH of water body. According to Dhanasekaran *et.al.,* (2017) due to presence of carbonate and bicarbonate natural water is generally alkaline in nature. They noticed higher pH values in summer season and pre monsoon, this might be due to anthropogenic activities like washing of cloths and release of sewage along with higher photosynthetic activities of phytoplankton. The higher photosynthetic activity resulted in increase of production of phytoplankton which support increase in pH (Das *et.al.*, 1956).

Dissolved oxygen is important parameter. Dissolved oxygen which is below 2 mg/lit is not desirable level for aquatic animals. According to WHO (2003) oxygen content of water is very important parameter and necessary for all living organisms. Temperature and salinity these both parameters affects the dissolution of oxygen (Vijaykumar *et al.,* 2000). In the present study, the dissolved oxygen (DO) was 4.82 ± 0.5 during winter, 3.17± 0.40 during summer and 4.23 ± 0.20 in rainy. Raj *et.al,* (2018) noticed dissolved oxygen value fluctuated between 1.62- 25.92 mg/l.

The biological oxygen demand (BOD) value varied according to seasons. It was 2.91 ± 0.10 in winter, 1.52 ± 0.20 during summer and 2.49± 0.31 was observed during rainy season. Patra *et al.*(2011) stated that microbial decomposition of organic matter in greater extent results in depiction of oxygen with higher BOD values. Datta *et.al.,* (2013) studied biodiversity and seasonal abundance of zooplankton and its relation to Physico chemical parameters of Jamunabundh, Bishnupur, India oxygen value ranged between 2.4 mg/l during post monsoon to 10.4

mg/l during winter. According to them in higher temperature the solubility of oxygen is lowered and organic substances are degraded. Concentration of DO is inversely proportional to water temperature.

The chemical oxygen demand (COD) also varied season wise. It showed maximum value during summer followed by winter (8.78 ± 0.16) and rainy (7.13± 0.21). According to Ingole *et al.*(2009), summer season generally records maximum concentration of COD which is may be due to high rate o degradation of organic matter in summer season. Rathod *et al.*, (2009) stated that due to higher BOD values oxygen level were depleted, which lead to critical condition and indicates the pollution of water.

Overall, from our results, the seasonal fluctuations in these parameters may be due to activities taking place in the lake. These include photosynthesis, respiration, decomposition of organic matter, growth of aquatic plants etc.

Conclusion: Due to some anthropogenic activities, the fresh water bodies are polluted. Analysis of physicochemical parameters of water gives idea or information about status of given fresh water body and its impact on flora and fauna. Healthy aquatic life mainly depends upon the quality of water. Optimum level of quality parameters is essential for physiological processes of aquatic plants, animals, microbes and overall health of water body. Hence emphasis should be given to avoid the water pollution. In present study all physicochemical parameters are found within desirable range as per standards of ISI. The present investigation resulted for seasonal fluctuations in physicochemical factors from different sites. The water which is been stored in Ekruk lake is basically used for irrigation as well as the domestic use to the certain areas of Solapur city. Hipparaga Tank (Ekruk Lake) is serving as major breeding site for migratory birds in winter season. The tank is a natural heritage. It has great potential to become ecotourism centre and initiation of aquaculture practises. Therefore illlegal fish catching should be banned and it is the responsibity of all stake holders to protect and conserve overall diversity of Hipparaga Lake.

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