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Analysis of physicochemical parameters of rivers of District Surab Rivers of Balochistan, Pakistan

Altaf Hussain, Ghulam Dastagir*, Lawang Gurganari, Mahrukh Naseem, Aisha Mehrab

Department of Zoology, University of Balochistan (UOB), Quetta, Pakistan

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Abstract

The present study was designed to assess the Physicochemical parameters and the purpose of immunological variation and analysis of physicochemical parameters of freshwater bodies of District Surab River, i.e. (Surab city Hajeeka, and Gurgut). The collection of water samples was started from October 2019 to October 2020. The physicochemical parameters, i.e., Temperature, Turbidity, pH, DO_2, Salinity, TDS, Conductivity, BOD of analysis of water, were enumerated,noticed and observed no significant variation was recorded by Jenway Model No. 3305 Finally concluded that water of three different stations of district Surab was found to be suitable for drinking, irrigation and fisheries management purposes.

* **Corresponding Author:** Ghulam Dastagir ✉ dastagir76@gmail.com

Introduction

The quality of water has a great influence on the population of aquatic organisms (Adeyemo *et al.*, 2008). Excess utilization of artificial feed and nutrients has been reported to raise the number of total dissolved solids in ponds fish (Ehigbonare *et al.,* 2010). The layout and the geography of a particular area also affect the quality of water. Anthropogenic actions, like erosion, geological characteristics, weathering, of the environment, geochemical and ever-growing population of the globe have kept fluctuations in natural water bodies (Adefemi and Awokunmi, 2010). Numerous parameters support understanding the various processes of metabolism within the ecosystem. These factors, along with the fauna and flora distribution, can influence the abundance in the aquatic ecosystem (Shinde *et al.*, 2011). The pH value of water is 7.0, which is neutral; below 7 refers to acidic and above 7 is alkaline. It has been notified that pH of the water body increases during the daytime because of aquatic flora (Boyd and Tucker, 1998). Temperature plays an important role in certain physiological processes, such as they induce the stimuli in fish for breeding in the various aquatic environment. Dissolve oxygen (DO) can affect both solubility and accessibility of nutrients to the fish. The water with low DO within 3.0-5.0ppm causes decreases the productivity, while increased productivity requires DO concentration of more than 5.0 ppm (Alikunhi *et al.*, 1952).

Turbidity is the measurement of inhibition of light passing all the way through water (Landau, 1992). Turbidity is mostly high in the winter season—the turbidity caused by clay affects the growth of aquatic plants (Boyd and Tucker, 1998). Total Dissolved Solids are associated with certain aspects such as geographical characters of rainfall, surface runoff and water-shedding (Singh *et al.*, 2010). Higher conductivity notifies the presence of pollutants (Solomon *et al.*, 2013). Conductivity helps to determine the fish production in the pond (Sikoki, *et al.*, 2004). As a result, biological, chemical and physical parameters affect water quality. Hence regular monitoring of physicochemical parameters is essential (Arain *et al.,* 2014). These parameters are limiting factors for the survival of aquatic organisms (flora and fauna) (Lawson, 2011). *The current study is an attempt to determine* immunological studies and analysis of physicochemical parameters of water of Surab freshwater. Therefore, in this attempt which we present a detail description of fish immunological studies and analysis of physicochemical parameters of water to restraints the habitats of fishes in rivers of District Surab.

Materials and methods

Study area

For the purpose of immunological variation and analysis of physicochemical parameters of freshwater of District Surab River, Sampling has been done on a monthly basis from October 2019 to October 2020. Water samples were collected near the surface of the stream and depths about 10-15 inches of the same area and kept in jerry cans. Sampling was estimated from 10 A.M to 12 P.M.

Sampling Stations and the PhysicoChemical Parameters

Water samples were collected from water bodies of district Surab from three stations of (Surab city Hajeeka, and Gurgut) which are shown in Fig.1 on the basis of monthly. After examining the bottles, they were taken for examination to the Department of Zoology for examination. The pH of the water pH meter (Jenway Model No. 3305) was used, Oxygen meter (Jenway) for Dissolved Oxygen (DO) Calculation. Total solid dissolve (TDS) and salinity to water (ppt).

Determination of Air and Water Temperature

A portable digital thermometer was used to determine air temperature and the amount and content of Temperature, Turbidity, pH, DO_2, Salinity, TDS. Conductivity BOD were discussed by Jenway Model No. 9500) Using complete solids, dissolve and salinity, the above parameters were calculated. pH meter (Jenway Model No. 3305) of (fixed in beakers having water samples as per equipment's of APHA (1980; 2005) and Seechi Disc (Boyd,1990) was

used to measure water transparency fixed in beakers having water samples and readings were documented as per types of equipment of APHA (1980; 2005). At the sampling area, the temperature was measured by using a mercury thermometer. Sacchi disc was used to measure the transparency of the water sample. A turbidity meter was used to measure the turbidity of water and conductivity was measured by using a conductivity meter.

Result and discussion

Physicochemical Parameter of freshwater river

The water samples were analyzed for physicochemical Parameters of water bodies of District Surab the physicochemical parameters, i.e., Temperature, Turbidity, pH, DO_2, Salinity, TDS. Conductivity BOD of analysis of water were studied in four seasons and the results are described in Table 1 and Fig. 1. An effort was concluded in the study to measure the water quality variations every month from October 2019 to October 2020, winter, summer, autumn, spring at three different stations of District Surab. Water temperature is an essential parameter that affects the biochemical relationship in the organisms of water (Trivedi and Goel, 1986).

The average temperature of the water was recorded in the present study was 09 ±34℃. The fluctuation of lower and higher in water temperature effects the metabolic activities, migratory behavior of crustaceans and development, reproduction of fish.

It was observed that temperatures gradually started increasing from March, achieved their peak in June and dropped abruptly in September. Same finding with little fluctuations was observed by Shaari *et al.* (2013); Shi *et al.* (2013), while the slightly higher temperature was recorded by Effendy *et al.* (2016).

Table 1. Month wise variations of chemical and physical parameters. Water bodies of District Surab during October 2019 to October 2020.

Month	Temp. °C	Turbidity	pH	DO_2 mg/L	Salinity g/L	TDS mg/L	Conductivity µS	BOD mg/L
Oct	21.3°C	55.73	7.2	5.5	0.2	412	241	3.1
Nov	18°C	46	7.0	6.6	0.3	343	244	6.2
Dec	09°C	52	6.1	6.1	0.4	321	245	6.2
Jan	2°C	51	5.3	5.2	0.1	263	241	4.3
Feb	2°C	47	5.6	5.3	0.2	249	242	4.2
March	5°C	46	6.3	5.5	0.3	223	241	4.1
April	13°C	28	6.6	7.2	0.3	495	240	5.9
May	19°C	33	7.6	7.5	0.2	409	237	5.7
June	26°C	38	7.2	6.3	0.3	445	237	5.1
July	34°C	20	7.2	7.6	0.2	483	241	5.2
Aug	32°C	36	6.4	6.5	0.3	483	242	4.4
Sep	29.2°C	44	6.3	7.3	0.4	418	244	3.1

The water turbidity is mainly caused by suspended particles like slits, organic nutrients, clay, sand particles, zooplanktons, and phytoplankton. In the present study, the average value of turbidity was 20.±55.73 cm. However, slightly higher turbidity was recorded by Effendy *et al.* (2016). pH is a parameter that defines the appropriateness of water for various purposes. In the present study of pH, the average value was 5.3±7.02, which is within drinking water as per (7). The pH of water affects many biochemical processes in water. pH levels fluctuate due to photosynthesis and respiration in the water. The change in value depends on the alkalinity of the water. Araoye (2009) published similar findings; Shi *et al.* (2013). However, Chughtai & Mahmood (2012) reported higher pH in the semi-intensive carp cultivation system. Dissolve oxygen is a vital parameter that is important for aquatic organisms. Aquatic organisms need dissolved oxygen to respire.

In the recent study, the dissolve oxygen average value was 5.02±7.06mg/L. Similar results were reported by Dulic *et al.*, 2010. Nonetheless, Effendy *et al.* (2016) published contrary findings. The higher absorption of

DO, however, was due to increased oxygen solubility in water during winter and low solubility through summer. Salinity stands for the amount of salts dissolved in water. In a recent study, the observed average value was 0.1±0.4g/L. The same results were also reported by Bera *et al.* (2014). During winter, salinity was low but slowly increased with temperature. The decrease in salinity was connected to low evaporation and running water dilution factor. Effendy *et al.* (2016) reported contradictory results.

Total dissolve solids include inorganic salts and small quantities of organic matter that are dissolved in water. Dissolve solids are good for drinkable water. Water possibility depends upon the total dissolve solids. The mean value of total dissolve solids was 249±483 mg/L.

The required value of TDS is 500mg/L. The conductivity of water is the ability to transmit heat or ions present in water. It describes the nutrient status of water. Comparable findings were supported by several researchers (Islam *et al.,* 2004;). In hotter months, higher values of (TDS) were observed.

The average value conductivity was 237.±244µS. The seasonal difference of conductivity may be due to deficient inflows of freshwater, the release of slits and salts from nearby and some domestic effluents (Gupta and Dey 2013); Mateka *et al.*, 2015) reported that increased conductivity may result from pollution as debris, runoff during rainfall.

During the evaluating period of October 2019 to October 2020 biological oxygen demand (BOD) range was 3.1±6.2 mg/L (Table1).

Conclusion

It was concluded that no significant variation was observed. Only a few essential nutrients are present, which indicates abundantly primary producers, which turn to the favorable for drinking water and irrigation. Finally, it was concluded that water bodies of District Surab River are suitable for drinking, irrigation and fisheries management.

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