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## Physico-chemical analysis of Son Gharial Sanctuary water from Sidhi district (M.P.)

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### Abstract

The biological features of Son Gharial Sanctuary water are influenced by its physico-chemical properties, which also reveal the current state of the river water's water quality analysis. The current study examines the physical-chemical characteristics of a water sample taken from the Son Gharial Sanctuary in the Sidhi area between November 2022 and October 2023. To find the highly connected and related water quality measures, correlation coefficients between various parameters were computed, and significant levels were determined. Water temperature, pH, conductivity, total dissolved solids, dissolved oxygen, carbon dioxide, total alkalinity, total hardness, calcium hardness, magnesium hardness, chloride, and phosphate are among the various physico-chemical parameters whose values have been observed. The world health organization's (WHO) standard values and the observed values were compared. For this reason, drinking water is dangerous.

**Keywords:** Son Gharial Sanctuary, Physico-chemical parameters and Water quality

### Introduction

Living things mostly obtain their limited supply of water from freshwater bodies. However, due to pollution from agriculture, industry, and human activity, it is becoming increasingly difficult to obtain safe water. This has an impact on both the quality of the water and the creatures that can survive in freshwater. Water that is safe is vital to a healthy life. However, today's first line of defense against infection and sickness is a sufficient supply and the prevention of water pollution, which treats tainted water supplies and makes them safe for consumption (WHO, 1984) [12].

Although the molecular makeup of water is not particularly complex, its distinct physical and chemical characteristics are what allow it to survive on our planet. The characteristics of water offer a structure and some methods for interacting with biological activities. Recent years have seen the importance of environment monitoring through routine water quality assessments for the preservation of aquatic resources rise (Pradhan 2014) [7]. In terrestrial, aquatic, and coasted marine systems, the flux of both inorganic nutrients and organic matter is increased by human activities, runoff from agriculture, pollution from septic systems, and sewers (Sura *et al.*, 2010) [8]. the effect of pollution on trophic and toxic level of water can be detected, estimated and quantified by physicochemical methods (Warhade and Chavan, 2011) [10].

According to Pradhan (2014) [7], inadequate management of water resources has directly or indirectly resulted in the degradation of hydrological environment. Therefore, regular monitoring of Physico-chemical parameters of freshwater is essential to determine the status of river. The implementation of the water quality is a need of time. Therefore, present study is focused on the study of Physico-chemical parameters and water quality of Son Gharial Sanctuary.

### Materials and Methods

#### Study area

The Son Gharial sanctuary area lies longitude 81°20' and 82°50' E and latitude 24°15' and 25°40' N. This river is a major tributary of the river Ganges which originates from Sonmuda in Amarakantk, Anuppur district (Madhya Pradesh) The river flows through M.P. and U.P. and joints the Ganges in Bihar.

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The course of the rivers of the Sidhi district is towards north and hence the slope of the district in general is towards north side. Sidhi district is largely hilly with an undulated land in which the height of the land above the sea level varies from 243.68-609.00 metres.

### Data Collection

Present ecological study is carried out on the basis of monthly variations from Nov. 2022- Oct. 2023 of Son Gharial Sanctuary in Sidhi district, Madhya Pradesh. Monthly samples were collected from the different stations of Son Gharial Sanctuary in a plastic bottle. Son Gharial Sanctuary is a freshwater lotic system passes through saline belt of Sidhi district.

The Physico-chemical parameters like Water temperature, pH, Conductivity, Dissolved oxygen, Total Hardness, Calcium hardness, Magnesium hardness, Alkalinity, Total Dissolved Solids, Chloride, Phosphate, Sulphate, Nitrate, Silicate. All the parameters were examined by methods suggested by APHA (2001)<sup>[1]</sup>. Temperature and pH of water samples were measured at the time of collection site. All generated data were analysed statistically by calculating mean value with acceptable standards.

### Results & Discussion

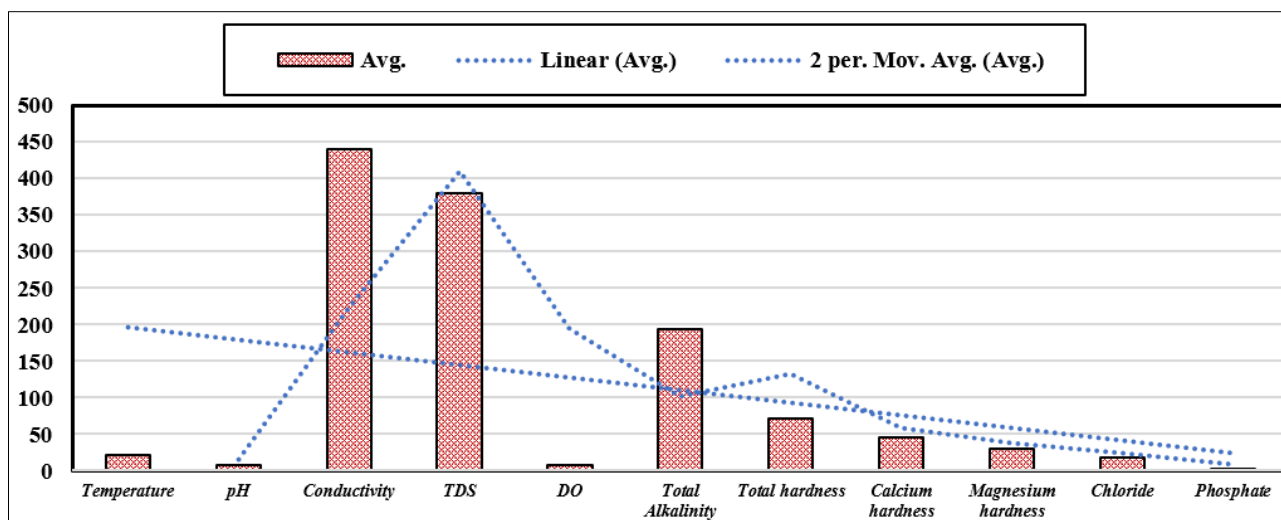
The physicochemical parameter observations from the current experiment are shown in Table No. 1. The values entered into the provided table are contrasted with the WHO (2004)<sup>[11]</sup> standards. The ranges of different parameters are displayed in the observation table. Due to seasonal variations, the lowest water temperature is recorded in December at 19.6 °C, the highest in May at 23.8 °C and average 21.41 °C. The lowest pH value is recorded in September at 7.01, and the highest in June at 8.5 and average 7.74. The lowest conductivity value is recorded in June at 370 µmhos/cm, and the highest in October at 521 µmhos/cm. and average 740.25 µmhos/cm. The lowest TDS value was recorded in February at 335 mg/l, and the highest value was recorded in September at 427 mg/l. and average 380.25 mg/l. According to table 1, the lowest value of

dissolved oxygen is 5.1 mg/l in the month of March, and the highest value is 8.2 mg/l in the month of December and average 7.36 mg/l. (table 1). The value of total alkalinity reaches its maximum in June (229 mg/l) and its minimum in October (163 mg/l) and average 194.17 mg/l. The lowest and maximum values of total hardness are 67 mg/l and 79 mg/l, respectively, in the months of January and April. In June and January, respectively, the greatest value of calcium hardness was 52 mg/l, while the minimum was 35 mg/l. Table 1 indicates that the maximum value of magnesium hardness was 36 mg/l in November and the minimum value was 26 mg/l in October. The maximum value of chloride was found to be 21.2 mg/l in June and the minimum value was 14.6 mg/l in October. The minima and maxima ranges for phosphate are 0.17 mg/l in April and 0.58 mg/l in October and average 0.36 mg/l. (Table 1).

The results of this experiment show that there is a clear relationship between water temperature and ambient temperature fluctuations. This is agreement with finding of Day and Hazra (2005)<sup>[3]</sup> and Vishwakarma (2013)<sup>[9]</sup> as shown in table 1. The increase in summer and decline in winter indicated that there is close relation between air and water temperature. This is needed by Namdeo and Singh, (2021)<sup>[6]</sup>; Maurya, *et al.* (2023)<sup>[5]</sup> in tropical impoundments. In Monsoon season and comparatively showing lower water temperature it might be due to low atmospheric temperature. In present study pH values from 7.82 to 8.94 were recorded in summer and minimum in rainy season similarly as Katariya and Sharma, (2010)<sup>[4]</sup>. Conductivity was found minimum in summer and maximum in winter and rainy season. The minimum value of T.D.S. was found in November month and maximum in May similar results have been reported by Baghel, (2023)<sup>[2]</sup>. Average value of D.O. was counted 6.0 mg/l to 9.2 mg/l was minimum in the October season and maximum in post summer. Alkalinity of water was found 62 mg/l and 82 mg/l in the month of August and December respectively. This value is found magnesium hardness average value was found to be 21 mg/l to 60 mg/l fluctuating during winter and Monsoon season reported by Namdeo and Singh, (2021)<sup>[6]</sup>.

**Table 1:** Monthly variation in Physico-chemical parameters of Son Gharial Sanctuary at Sidhi district During Nov. 2022- Oct. 2023

Months/ Parameters	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Avg.
Temperature	20.1	19.6	21.1	21.3	21.6	23.3	23.8	23.3	22.7	20.2	20.0	19.9	21.41
pH	7.8	7.2	7.5	7.7	7.5	8.0	8.3	8.5	8.1	8.0	7.01	7.3	7.74
Conductivity	506	488	460	410	389	392	380	370	416	455	496	521	440.25
TDS	360	342	338	335	355	384	401	409	412	418	427	382	380.25
DO	8.0	8.2	8.1	6.8	5.1	6.9	7.2	7.6	7.4	7.6	7.5	7.9	7.36
Total Alkalinity	184	174	195	188	210	207	216	229	210	184	170	163	194.17
Total hardness	69	71	67	70	75	79	77	70	73	68	70	74	71.92
Calcium hardness	40	41	35	46	43	41	46	52	50	51	48	50	45.25
Magnesium hardness	29	27	33	29	32	30	28	35	27	30	32	26	29.83
Chloride	14.9	15.7	16.5	16.9	15.6	19.2	20.7	21.2	20.2	18.4	15.5	14.6	17.45
Phosphate	0.51	0.46	0.32	0.24	0.20	0.17	0.24	0.33	0.47	0.41	0.44	0.58	0.36



**Fig 1:** Graph analysis of average variation in Physico-chemical parameters of Son Ghariyal Sanctuary at Sidhi district During Nov. 2022-Oct. 2023

### Conclusion

Based on the current study, it can be stated that the seasons and environmental conditions affect the physico-chemical characteristics of the water in the Son Gharial sanctuary. This river is utilized for irrigation, drinking, fishing, and other household needs. The monitoring of water quality would benefit from this investigation. Based on the disposal of waste, sewage water, and the discovery of pollution in sample water, it can be inferred that the water needs to be purified before consumption.

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