

## SEASONAL VARIATION OF PHYSIO-CHEMICAL PARAMETERS OF RIVER CHURNI. NADIA DURING 2019-2020

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*"together we can and we will make a difference"*

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## ABSTRACT

Churni river is one of the most important river of Ranaghat subdivision, Nadia district of West Bengal, India. The river flows from Majhdia township through Hanskhali, Birnagar, Ranaghat and finally joins river Bhagirathi at Shivpur near Chakdaha (23.13 North, 88.50 East). The biodiversity of any river depends on physicochemical parameters of river water. In this study, I had tried to find out seasonal variation of physicochemical parameters like pH, conductance, salinity, turbidity, dissolved oxygen (DO), biochemical oxygen demand (BOD), total dissolved solids (TDS) and hardness during the period April 2019 to March 2020. The variations of physicochemical parameters throughout the year have a profound influence on river ecosystem, as it is a lotic ecosystem.

**Keywords:** Physicochemical parameters, Churni river, Water

## INTRODUCTION

River Churni originated from Mathabhanga river which is a tributary of the Padma river. The Churni river flows through the Nadia district of West Bengal, India with a length of approximately 56 kilometres [1]. The fact is that, Mathabhanga divides into two streams, namely Ichamati and Churni near Majhdia in Nadia district. Before independence the river was an important route of water travel and trade. More than 100 years the river is an important domain of fresh water fish biodiversity. More than 48 fish species are available along with green algae, blue-green algae, diatoms and phytoplanktons. The phytoplanktons are Eudorina, Pleodorina, Volvox, Pediastrum, Oocystis, Scenedesmus, Coelastrum, Ulothrix, Gloeotila, Oedogonium, Cladophora, Stigeoclorium, Mougeotia, Zygnema, Spirogyra, Microcystis, Aphanotece, Synechococcus, Merismopedia, Dactylococcopsis, Spirulina, Oscillatoria, Lyngbya, Schizothrix, Symploca, Microcoleus, Wollea, Nostoc, Aradaera, Raphidiopsis, Scytorema, Nitella, Anabaena, Oscillatoria, Chlorella, Eudoria and Gloeotrichia. Various zooplanktons are also present within the river [2]. The entire flora and fauna diversity depends on the physicochemical parameters of any river and

depends greatly on pH, salinity, dissolved oxygen(DO), turbidity, biochemical oxygen demand(BOD) and biologically significant Ion present within river water.

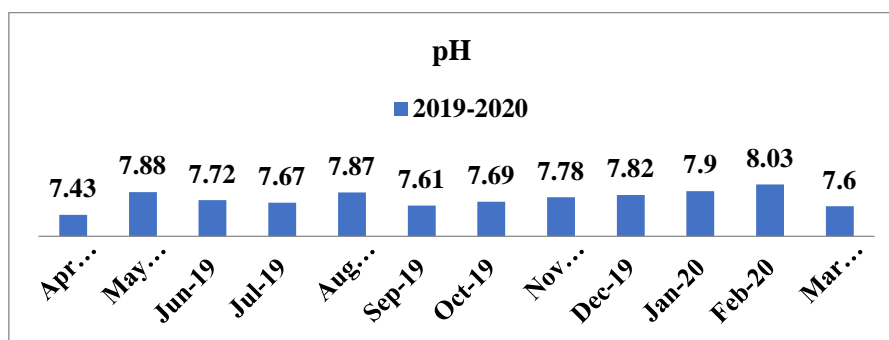
## MATERIALS AND METHODS

Water samples of Churni river were collected from five sampling sites; which are namely Taldaha, Sibnibas, Chandannagar, Kalinarayanpur and Ranaghat. All the sampling sites are located within Nadia district, West Bengal, India. The water samples were collected monthly intervals from April 2019 to March 2020 randomly from different depths of sampling sites up to 8-10ft of River Churni by the help of expert swimmers. All the water samples were analysed through Titrimetry, Spectrophotometry etc. At environmental chemistry laboratory of Barrackpore Rastraguru Surendranath College onsite measurements of some physicochemical parameters like pH, Conductance, TDS, Salinity were done using EUTECH made Multi-parameter PCSTester 35. On site dissolved oxygen was measured using Dissolved Oxygen Meter, Lutron DO-5509. The water samples were collected using sterile plastic bottles of 1000 ml or 500 ml capacity.

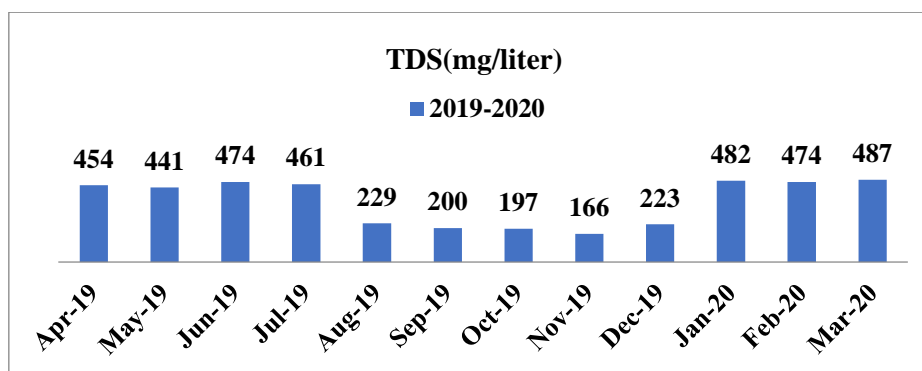
\*Author for correspondence

## Results

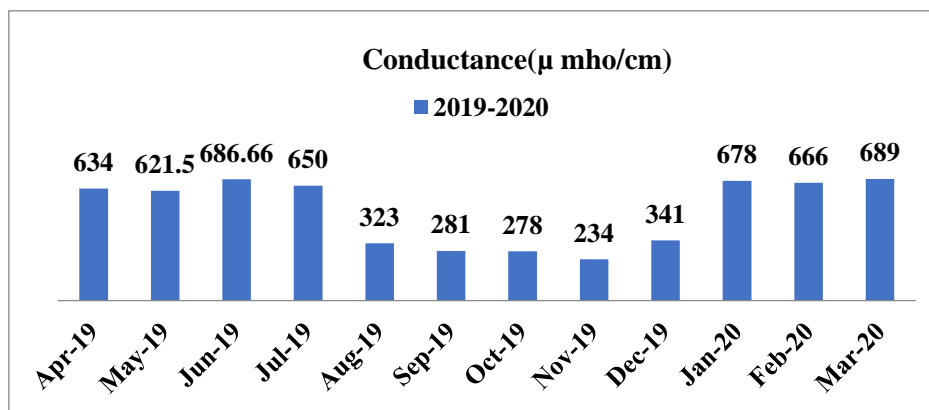
**Figure 1:** Monthly variation of pH data



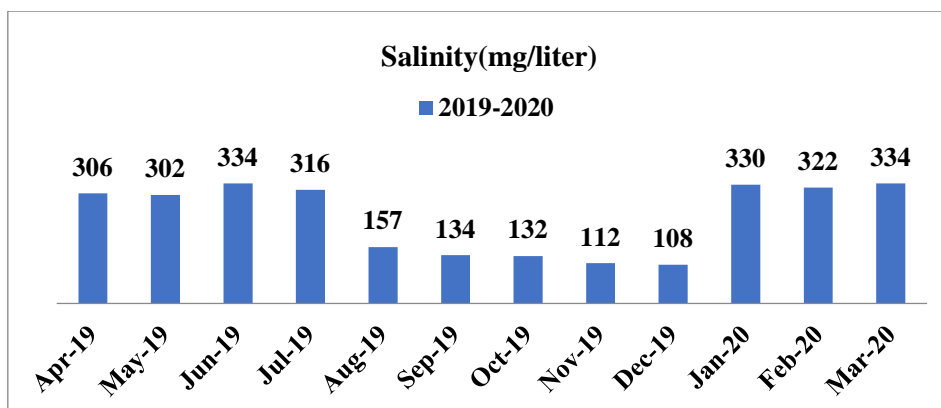
**Figure 2:** Monthly variation of TDS data



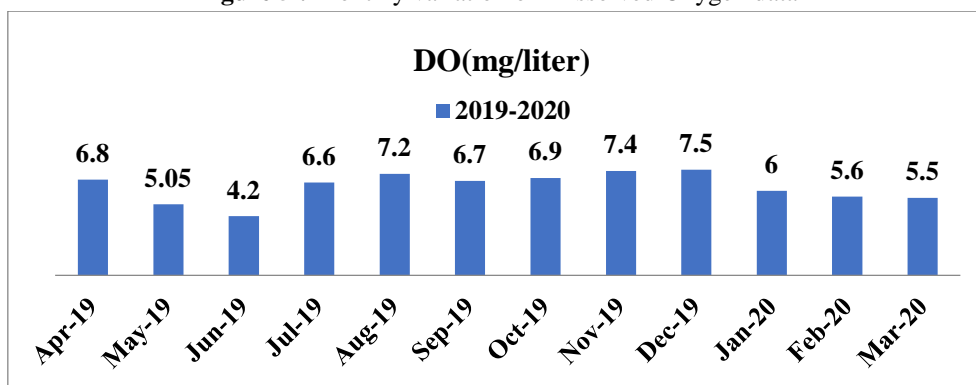
**Figure 3 :** Monthly variation of Conductance data



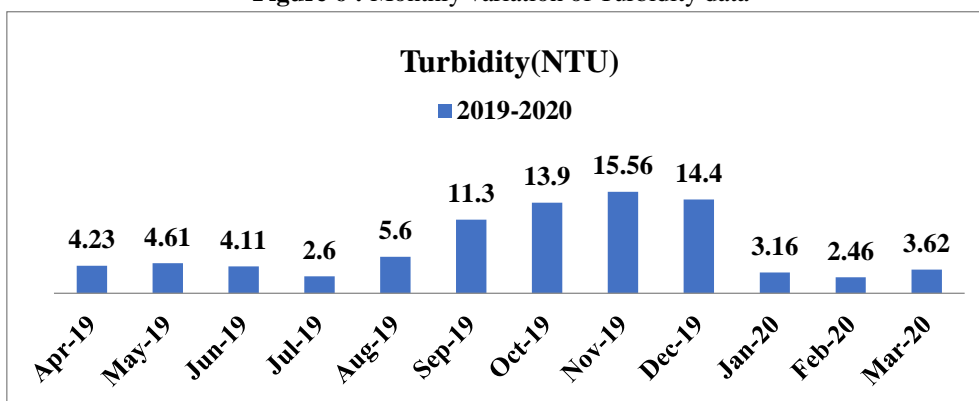
**Figure 4 :** Monthly variation of Salinity data



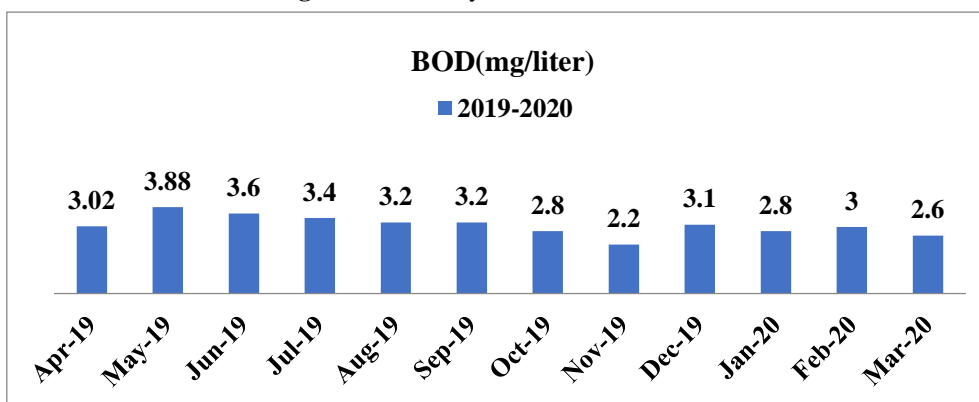
**Figure 5 : Monthly variation of Dissolved Oxygen data**



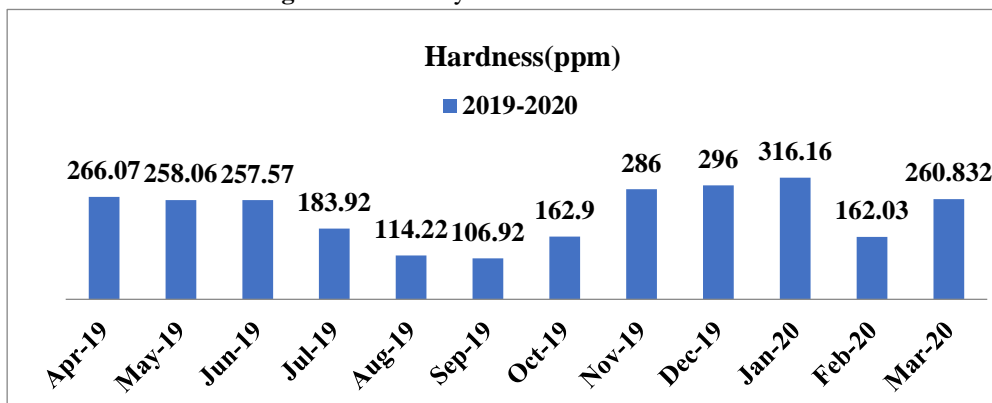
**Figure 6 : Monthly variation of Turbidity data**



**Figure 7 : Monthly variation of BOD data**



**Figure 8 : Monthly variation of Hardness data**



**Table 1:** Water uses of river Churni are described below

Water uses	Consuming	Contaminating
Domestic Use	Yes	Yes
Livestock watering	Yes	Yes
Irrigation	Yes	Yes
Aquaculture	No	No
Commercial fisheries	No	No
Forestry	No	No
Logging Bamboos	No	No
Food Processing	No	No
Textile & Pulp and Paper industry	No	No
Soil erosion from bank for Brick Factory	Yes	Yes
Mining	No	No
Water Transportation	Yes	Yes
Hydroelectric/Nuclear Power generation	No	No
Recreation	Yes	Yes
‘Bisarjan’ of Gods Clay Models	Yes	Yes
Swage water from towns and villages	Yes	Yes
Jute stem ratting	Yes	Yes

## DISCUSSION

Throughout the year the pH value remain minimum above 7.43 and maximum pH value was found during february 2020 was 8.03 (Fig 1). The TDS value lies between the range 166 to 487, low TDS are found during monsoon whereas TDS remain above 400 mg/lit in other seasons (Fig 2). Conductance value remains low during August to November (rainy season) but remain above 600  $\mu$ S/cm in other seasons (Fig 3). Salinity is inversely proportional with species diversity, salinity value remain within 108-334 mg/lit (Fig 4). Throughout the year the dissolved oxygen (DO) data were found between 4.2 to 7.5 mg/lit. The yearly average DO found 6.29 but the average DO during July to December (monsoon and post-monsoon) is 7.05 mg/lit (Fig 5). Turbidity value remains high at the end of monsoon and beginning of winter (Fig 6). The biochemical oxygen demand (BOD) value found within the range 2.2 to 3.88 (Fig 7). The hardness data reflects that the river is moderately hard except rainy season (Fig 8).

From the Table 1 it is evident that the major source of water pollution are domestic use of river water,

“bisarjan” of gods clay model, water transportation, Jute stem ratting, swage water from towns and villages etc. Another factor is waste water which comes through mathabhanga river from Bangladesh.

## CONCLUSION

From pH data it is clear that Churni river water is slightly alkaline in all the seasons. Growth of algae and other phytoplanktons depends on the variation of nutrients, pH, turbidity etc physicochemical parameters (3). Blue-green algae prefer slightly alkaline pH(4). Since salinity value varies within 108-334 mg/lit, a rich biodiversity is present within river. Various kind of flora and fauna are available within river water (5). During winter and summer river flow rate are relatively low and during monsoon it is high so,, TDS, conductance, salinity, hardness etc remain lower during the monsoon. During monsoon turbidity of any river turns high, this is also a fact for river Churni (Figure 6). The growth of cladocerans depends on water hardness. There are some indications that large cladocerans such as daphnia require higher specific quantity of calcium Ion. Conductance value reflect the amount of ions present within the river water. It is clear from Figure 3 that river Churni water

fauna. For drinking purpose, the river water should be purified and free from blue-green algae, toxins, bacteria, virus and suspended solids etc.

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