

COMPARISON OF PHYSIO-CHEMICAL PARAMETERS OF RIVER BHAGIRATHI, JALANGI AND CHURNI WITHIN NADIA, WB DURING 2020-2021

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ABSTRACT

The longest river within Nadia district is Jalangi (206 KM). Bhagirathi flows Plassey to Kalyani 187 KM. Churni covers 56 KM through its course within Nadia [1]. For all the three rivers pH value reflects slight alkaline nature of river waters. For all these rivers water, TDS and salinity values never moves below 100 ppm. Turbidity of Jalangi remain low throughout the year. Bhagirathi water shows high turbidity during monsoon. BOD value found below 4 mg/litre for all the three rivers throughout the year.

Keywords: Physico-chemical parameters, Churni, Jalangi, Bhagirathi, River water

INTRODUCTION

River Churni originated from Mathabhanga river which is a tributary of the Padma river. The Churni river flows only through Ranaghat subdivision, Nadia district of West Bengal. Bhagirathi flows through Krishnagar, Ranaghat and Kalyani subdivisions whereas Jalangi flows through Tehatta and Krishnagar subdivisions [2]. The entire ecology, flora and fauna diversity depends on the physico-chemical parameters of any river and depends greatly on pH, salinity, dissolved oxygen (DO), turbidity, biological oxygen demand (BOD) and dissolved carbon dioxide of river water. The physico-chemical parameters of any river is function of climate, temperature and rainfall, i.e., greatly depends on season [3]. In this study the target is to find out the seasonal variation of pH, conductance, hardness, TDS, dissolved oxygen (DO), salinity, turbidity, total alkalinity, carbonate alkalinity, bicarbonate alkalinity, biological oxygen demand (BOD) and dissolved carbon dioxide within Jalangi, Bhagirathi and Churni rivers. Some previous study on Jalangi and Churni rivers are available in literatures [4-7].

MATERIALS AND METHODS

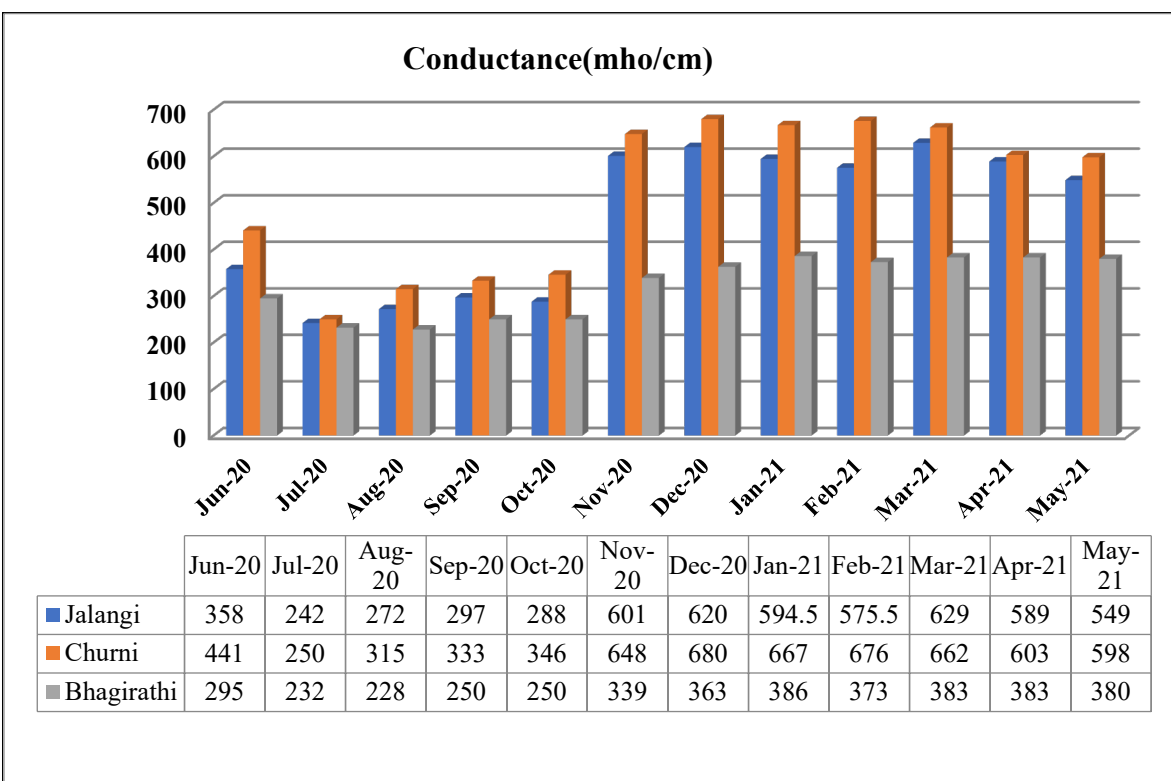
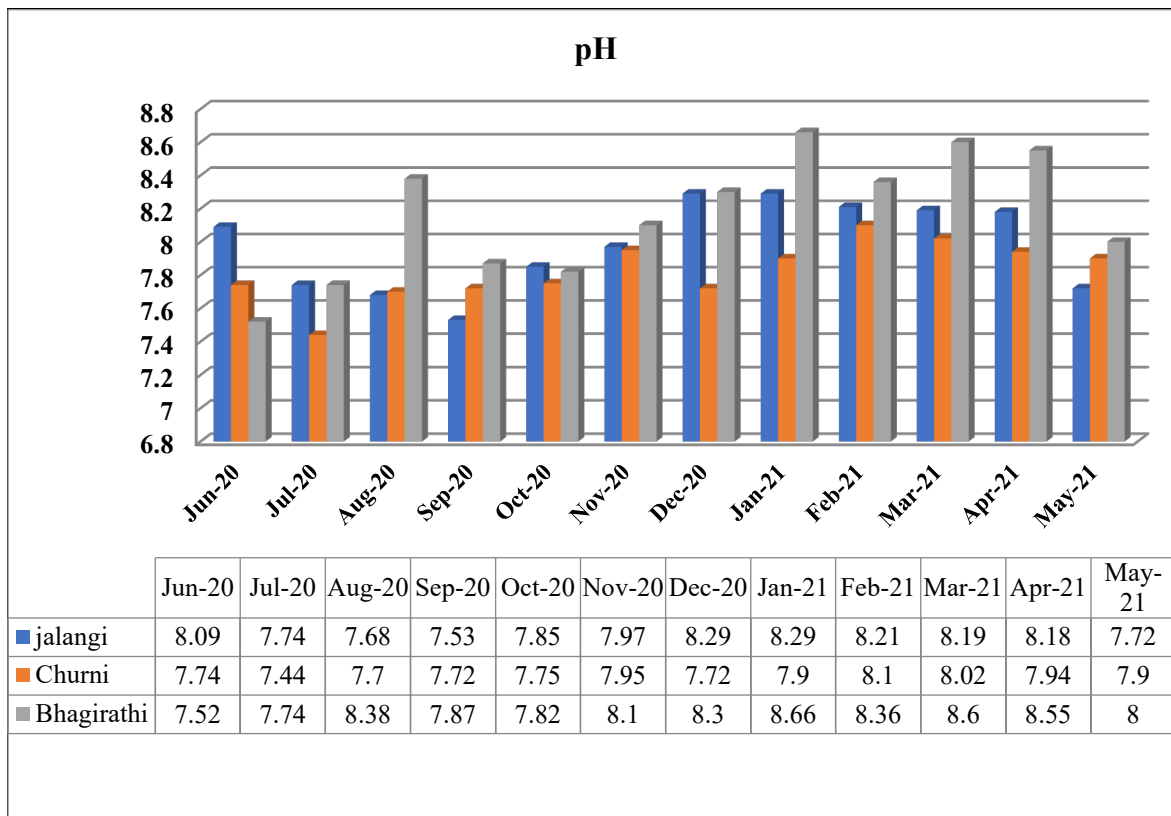
Water samples of Churni river were collected from five sampling sites; which are namely Taldaha, Sibnibas, Chandannagar, Kalinarayanpur and Ranaghat. All the sampling sites are located within

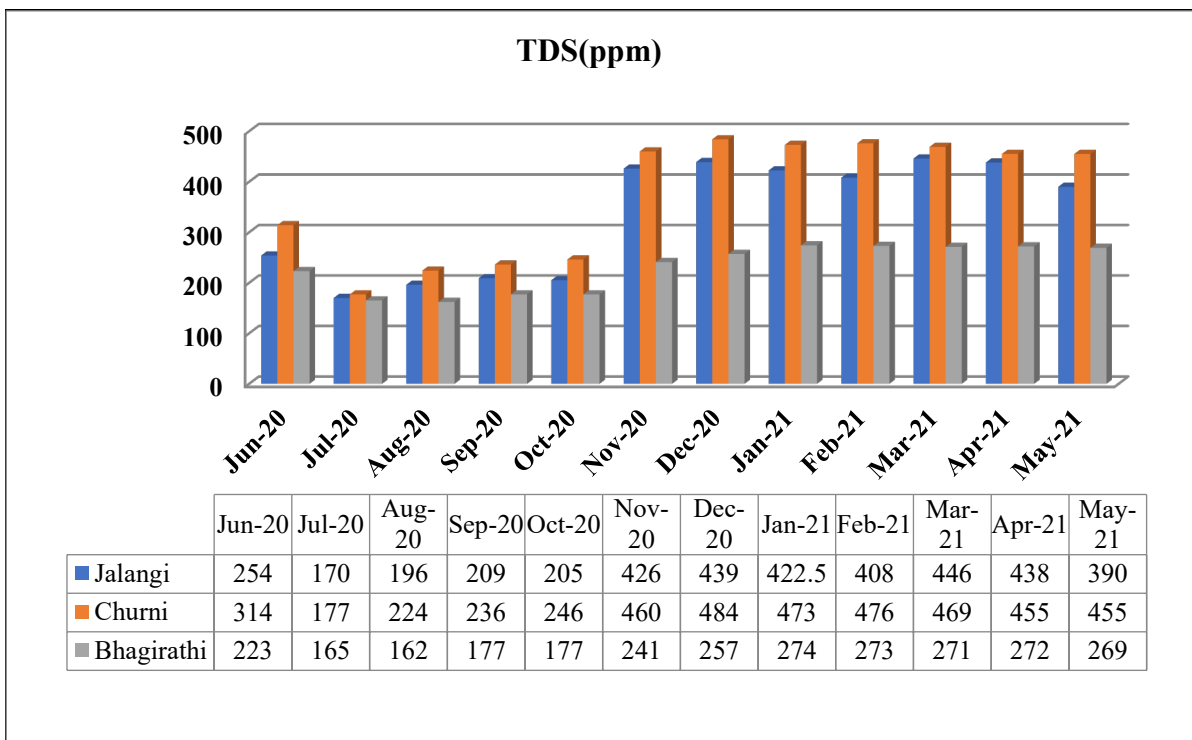
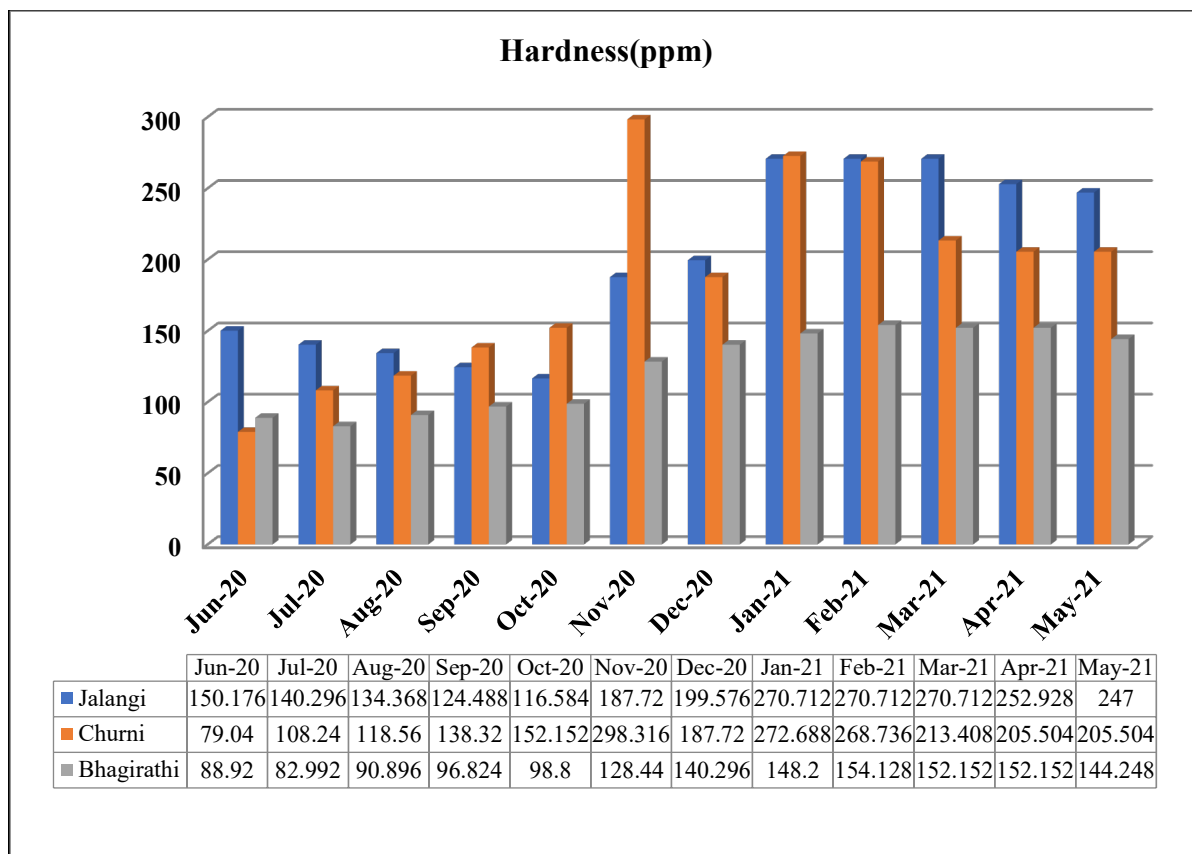
Nadia district, West Bengal, India. Water samples of Bhagirathi were collected from Nabadwip, Santipur, Chakdah (three sampling sites). Samples of Jalangi river were collected from Jitpur, Taranipur, Chapra, Haranagar, Anandanagar, Ghurni, Krishnagar, Kadamtala ghat, PWD more (rail bridge), Charsambhunagar and Hulorghat (Mayapur). All the sampling sites are located within Nadia district, West Bengal, India. The water samples were collected every month during June 2020 to May 2021 randomly from different depths of sampling sites up to 8-10 ft of rivers by the help of expert swimmers. All the water samples were analysed through Titrimetry and instrumental methods at environmental chemistry laboratory of Barrackpore Rastraguru Surendranath College. Onsite measurements of some physico-chemical parameters like pH, Conductance, TDS, Salinity were done using EUTECH made Multi-parameter PCSTester 35. Onsite dissolved oxygen was measured using Dissolved Oxygen Meter, Lutron DO-5509. Turbidity was measured using Systronics made turbidity meter (Model μ C Turbidity meter 135). The water samples were collected using sterile plastic bottles of 1000 ml or 500 ml capacity. Dissolved carbon dioxide were analysed in outside laboratory (Scientific research Laboratory, Santoshpur, Kolkata).

*Author for correspondence

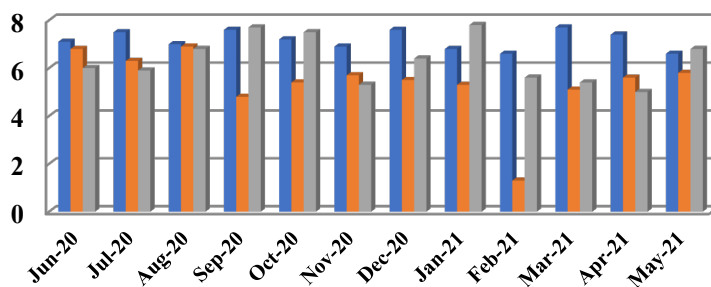
RESULTS

Table and Chart 1: Physico-chemical parameters of the studied rivers.



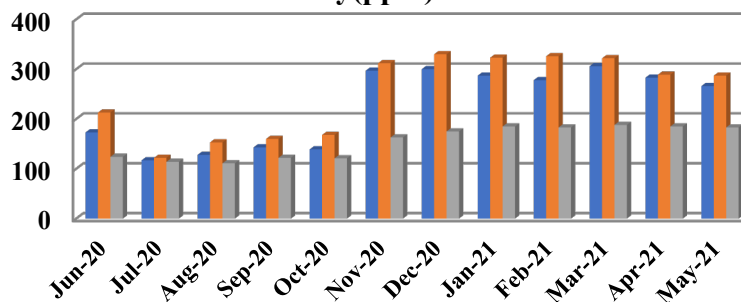


DO(ppm)



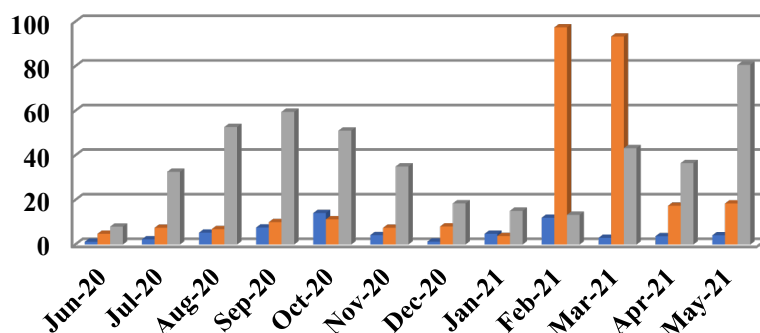
	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21
Jalangi	7.1	7.5	7	7.6	7.2	6.9	7.6	6.8	6.6	7.7	7.4	6.6
Churni	6.8	6.3	6.9	4.8	5.4	5.7	5.5	5.3	1.3	5.1	5.6	5.8
Bhagirathi	6	5.9	6.8	7.7	7.5	5.3	6.4	7.8	5.6	5.4	5	6.8

Salinity(ppm)

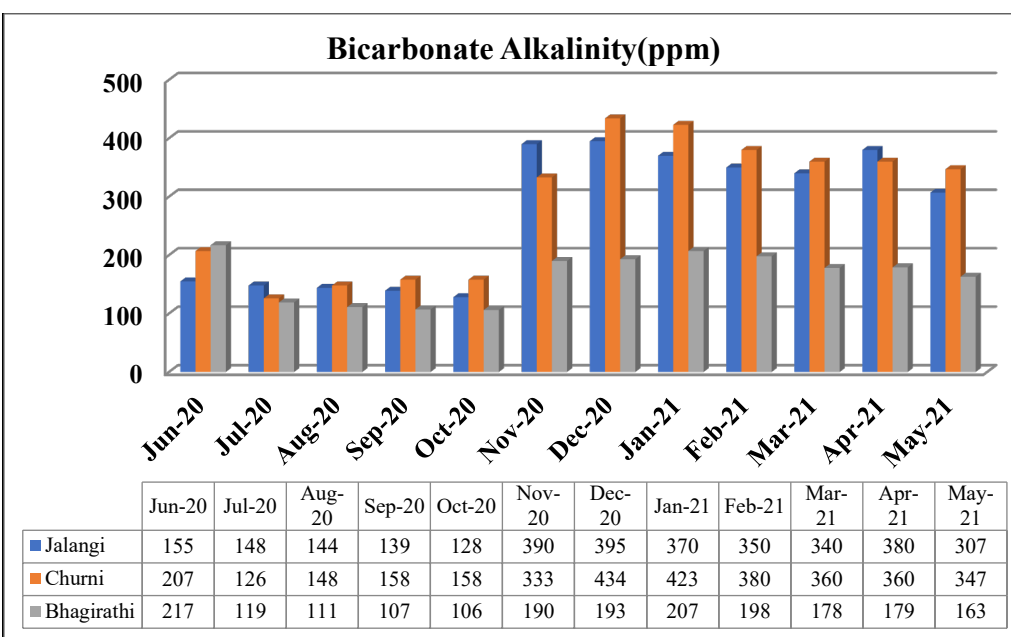
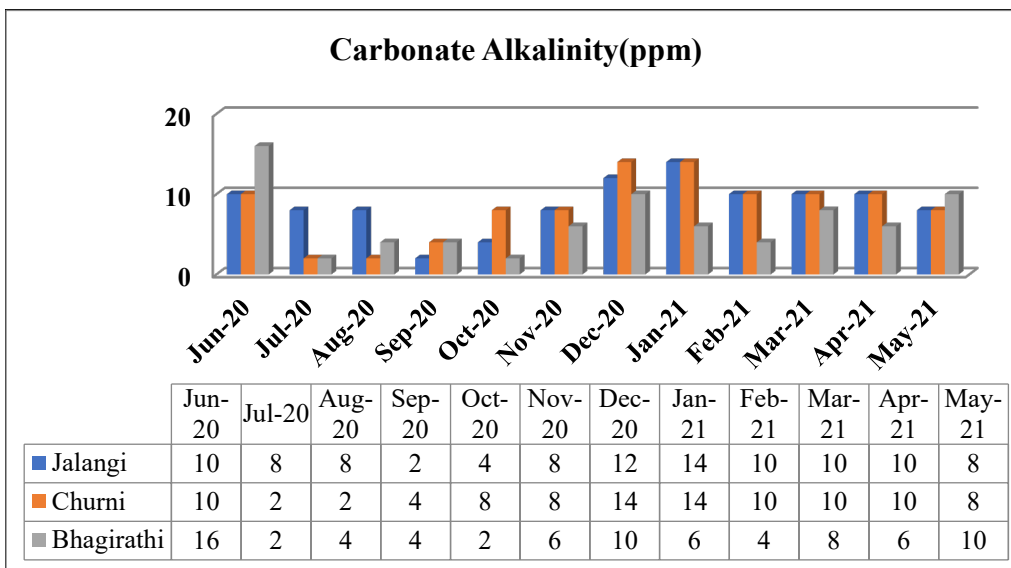
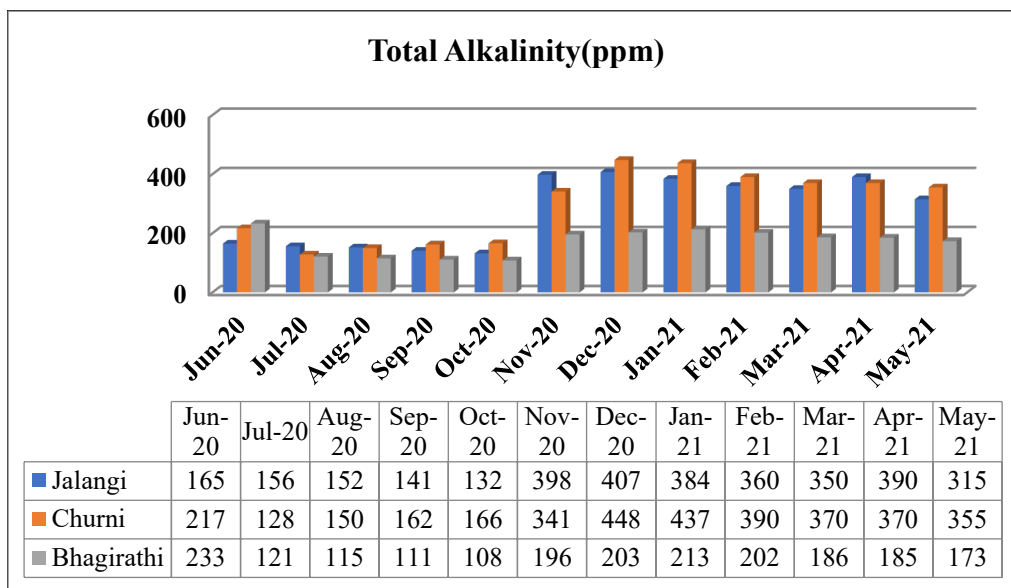


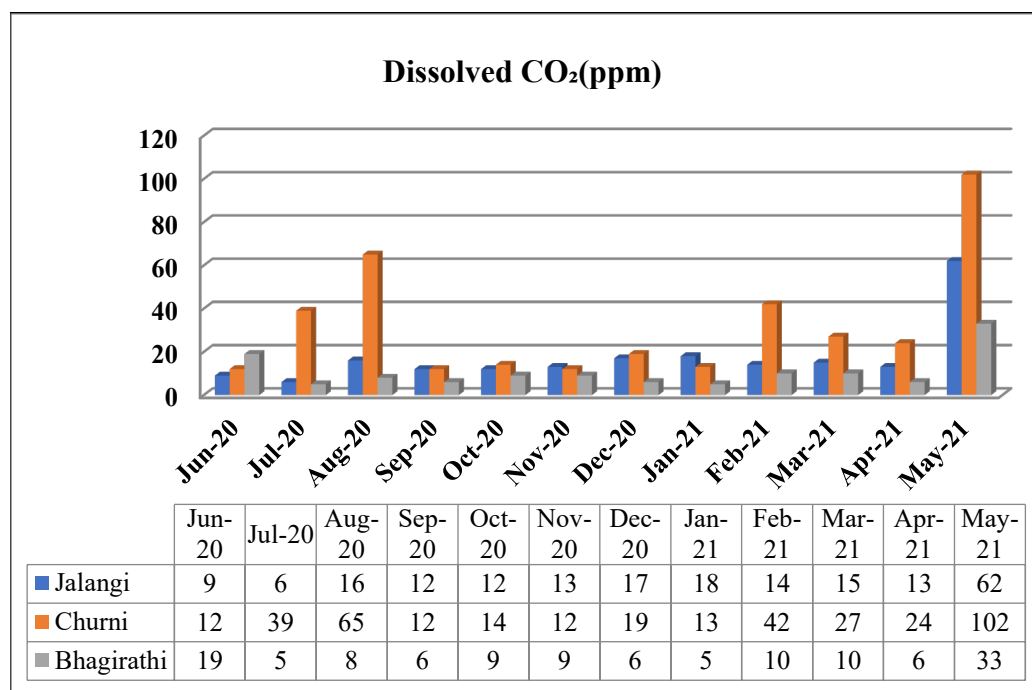
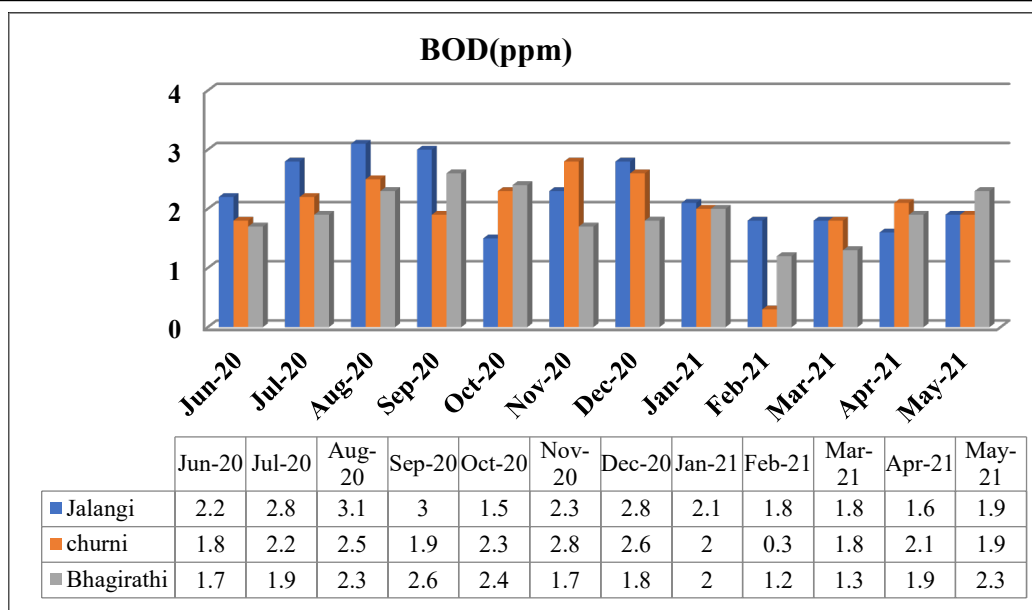
	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21
Jalangi	173	117	128	143	139	297	300	287	278	306	283	266
Churni	213	122	153	160	168	312	330	323	326	322	289	287
Bhagirathi	124	114	111	122	121	163	175	185	183	188	185	183

Turbidity(NTU)



	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21
Jalangi	1.23	2.3	5.3	7.6	14.1	4.2	1.3	4.8	12	3	3.7	4.1
Churni	4.8	7.5	6.9	10.03	11.3	7.5	8.1	3.8	97.4	93.3	17.4	18.4
Bhagirathi	8	32.6	52.7	59.5	51.1	35	18.45	15.1	13.3	43.2	36.5	80.6





DISCUSSION

Annual variation of Jalangi river water pH shows single hamp curves, but pH of Churni and Bhagirathi shows double hamp curves. For all the rivers conductance values are low during monsoon and have high values post monsoon, winter and summer. Hardness values remain between 50-150 ppm during the rainy season for all three rivers. High hardness values are observed for these rivers during post monsoon, winter and summer. TDS of Bhagirathi always found below 280 ppm. TDS of Jalangi and Churni during monsoon remain low, but in post monsoon, winter and summer remain between 400-

500ppm. Churni river is characterized by its low DO value (always below 7mg/lit). All the three rivers shows low salinity value during monsoon and high salinity values during post monsoon, winter and summer. In general Bhagirathi shows lower salinity values compare to the other two rivers. Turbidity increases during monsoon due to enhanced river flow rate. Astonishingly turbidity value of Churni river was found very high during February-May 2020. Churni river water contains higher level of dissolved carbondioxide. Dissolved carbondioxide is minimum for Bhagirathi among these river.

CONCLUSION

This study was started and carried out just after strict lockdown is over in West Bengal, i.e., June 2020. Among these three rivers in general Bhagirathi have higher pH values. Conductance values of Jalangi and Churni rivers are comparable throughout the year. Conductance of Bhagirathi remain relatively low than Jalangi and Churni. That means Bhagirathi river water contains less ions. However, hardness of Bhagirathi river never moves above 150ppm. TDS values are comparable for Jalangi and Churni throughout the year. Bhagirathi differs from them for its low TDS values. Low level of fauna diversity is found within Churni. With respect to Jalangi is best one for aquatic bio-diversity. The DO value of Jalangi always remain above 6.5. With respect to DO Bhagirathi water quality lies between Jalangi and Churni water. Aquatic species diversity depends on salinity. Bhagirathi river has the higher turbidity level than the other rivers. Total alkalinity shows that Churni river water is the most alkaline whereas Bhagirathi is the least. BOD values reveal that Jalangi water has relatively higher BOD than the other rivers. Average BOD for Bhagirathi is the least. During July 2020, August 2020, February 2021 and May 2021 the greatly enhanced dissolved carbon dioxide for churni river water arises mainly due to industrial waste coming to Darshana sugar mill, Bangladesh. Green algae prefer acidic pH (3.5-5) where as Blue-green algae prefers neutral or alkaline pH. Species diversity inversely depends on salinity. With respect to different physico-chemical parameters the river Jalangi may be the best pleasant habitat for flora and fauna, whereas Churni is the least pleasant habitat.

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