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Studies in Determination of Physicochemical Parameters of GAGAN River

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KEYWORDS

Parameters, quantity, laboratory, Gagan

ABSTRACT:
The present study is carried out in river Gagan to assess the extent of pollution by different industrial and aquatic activities. Five important sites are selected for sampling and analysed them in laboratory. .The result obtained from different parameters studied are pH (7.525-8.345), BOD (18.02-39.5), COD (43.37-69.5), Alkalinity (227.5-380.7), Turbidity (400-915) etc. These parameters are greater or lesser in quantity.

Introduction-If water is transparent, tasteless, odorless and nearly colorless then we called it pure. Enough though it do not provide any calory or organic nutrient, it is vital for all life forms .An amazing fact is that water plays an important in world economy. Approximately 70 % of fresh water used by humans goes to agriculture fields. An interesting feature of water is that it becomes less dense as it freezes. Having all these unique features water is still misused around the world and being polluted day by day.

The main role in water pollution is human activity by releasing untreated waste water into natural water bodies which leads to the degradation of a no of aquatic ecosystem. Result of this degradation can be seen on public health in downstreams areas. To overcome this problem polluted water analysed by physical, chemical and biological means.

The developing countries the India and the China are two countries with high level of water pollution. Near about 90% of the water in the cities of china is polluted. As of 2007,half a billion china people had no access to safe drinking water.

Material and method-for physico chemical analysis of river Gagan, water samples collected from 5 different sites namely- (1) Chaudharpur (2) upstream river at Moradabad Delhi bridge (3) downstream river at Moradabad- delhi bridge (4) upstream river at Moradabad – Sambhal bridge (5) downstream river at Moradabad- Sambhal bridge.

For collecting the samples wide mouthed plastic bottels of 1L capacity are used. These samples are analysed by using standard methods of physico- chemical examination of water. Samples analysed by the following methods- temperature were recorded on the site. For the guesstimaton of BOD and DO the samples were fixed on the sampling site. Other parameters viz calcium, alkalinity, turbidity etc are estimated in laboratory. Transparency by secchii disk method, alkalinity by physical method, pH by pH meter, turbidity by Turbiditymeter, Electrical conductivity by EC meter, Biological Oxygen Demand (BOD) by 5 days incubation method, Dissolved Oxygen (DO) by Titration method, Chemical Oxygen Demand(COD) by Dichromate titration method, Total Dissolved Solids(TDS) by Gravimetric method after filtration Calcium(Ca^{2+})by EDTA titrametric method Nitrate(NO_3^-) by Ion selective electrode method

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Result and Discussion-

S.No	Temperature		Transparency		pH	
	2017	2018	2017	2018	2017	2018
Site A	21	25.9	17.88	15.27	7.525	7.44
Site B	20	25.3	14.13	12.23	7.88	7.487
Site C	18.75	23.3	13.285	11.03	7.89	7.594
Site D	18	23.3	11.1	9.88	8.345	7.63
Site E	20	25.5	15.375	13.26	7.85	7.454
	Nitrate		Total Dissolver Solids		Dissolved Oxygen	
	2017	2018	2017	2018	2017	2018
Site A	.9325	1.79	276	205	2.15	2.00
Site B	0.77	0.98	215	188	6.15	4.62
Site C	0.65	0.97	182	165	6.55	4.98
Site D	.515	0.69	55	150	7.10	6.72
Site E	0.825	1.06	218.5	200	5.45	4.06
	B.O.D		C.O.D.		Electrical Conductivity	
	2017	2018	2017	2018	2017	2018
Site A	39.5	32.70	69.5	51.09	560	788
Site B	29.1	25.81	56.5	50.50	455	605
Site C	24.25	25.60	55.5	50.12	390	575
Site D	18.02	24.98	53	43.37	310	499
Site E	35.5	31.57	65.5	50.95	485	760
	Turbidity		Alkalinity		Calcium	
	2017	2018	2017	2018	2017	2018
Site A	915	775	227.5	230.8	14.03	12.88
Site B	785	666	242.5	245.9	11.024	11.04
Site C	525	423	247.5	359.7	10.028	9.93
Site D	465	400	257.5	380.7	8.02	8.33
Site E	870	697	230	235	13.098	11.74
	Total biomass		Color			
	2017	2018	2017		2018	
Site A	4.361	8.98	Off white		Off white	
Site B	7.0125	8.62	Off white		Off white	
Site C	7.188	9.05	Off white		Off white	
Site D	11.34	9.47	Off white		Off white	
Site E	6.638	8.81	Off white		Off white	

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Dissolve Oxygen (DO): Dissolve oxygen is one of the key factor of natural or waste water. It is influenced by the physio-chemical parameter and biological activity. Dissolved oxygen varies from 2.00 mg/l to 7.1 mg/l by analyzing the samples from five different sites in winter season.

Total Dissolve Solid (TDS): TDS shows the salinity nature of river water. High amount of TDS results a thin layer of salt in cooking utensils. TDS value determined in the study area varies from 55 mg/l to 276 mg/l in the winter season of year between 2017 and 2018

Temperature-Temperature controls the behavioral characteristics of organisms and salts in water, no other factor has so much importance as temperature The temperature value varies from 9.88ºC to 17.88 ºC during two year research period in winter season.

Turbidity-Turbidity is the measurement of extent to which light is either absorbed or scattered by suspended material in water .Turbidity value varies from 400 to 915 mg/l in winter season of year 2017 and 2018.

Electrical Conductivity- It is the measurement of capacity of a substance to conduct the electric current. Mostly salts in water are present in their ionic form and capable of conducting current. From year 2017 to 2018 the value of EC varies from 310 µmoh /cm to 788 µmoh /cm in winter season.

Alkalinity**:** The capacity of water to neutralize strong acid is known as alkalinity. During winter season the higher value i.e 359.7 mg/l and lower value i.e 227.5 mg/l of alkalinity is calculated.

Calcium(Ca2+): Calcium ions are important element to develop proper bone growth. It is alkaline in nature. Calcium content is very common in groundwater because they are available in most of rocks in abundant amount. Calcium ion content in gagan river varies from 8.02 mg/l to 14.03 mg/l during research period in winter season.

Chemical Oxygen Demand: The amount of oxygen consumed by oxidisable organic substance is COD. In the present study, COD value varies from 50.12 mg/l to 69.5 mg/l in winter season between two year (2017-2018) study period.

Biological Oxygen Demand – BOD is the amount of degradable organic matter present in the water sample. BOD value between year 2017 and 2018 comes under the range of 18.02 to 39.5 in winter season.

pH- pH gives an idea of the concentration of hydrogen ions, which inturn yields indirect information of free CO_2, alkalinity, dissolved oxygen, dissolved solids and thus may serves as test of several environmental conditions pH varies from 7.44 mg/l to 8.345 mg/l by analyzing the samples from five different sites in winter season

Nitrates-Total nitrogen in the sediments comprises nitrites, nitrates and ammonical nitrogen. Almost dead animal and plant tissues release nitrogen to the soil and from the soil it moves to the sediments. In the winter season of year 2017 and 2018 the limit of nitrate lie in between 0.515 mg/l to 1.79 mg/l.

Total biomass-Biomass is the mass of living plant characteristic material, and generally in respect to volume. Total biomass observed in the present study ranges from 4.361 mg/l to 9.47 mg/l.

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