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Studies on Physicochemical Parameters to Assess the Water Quality of River GAGAN for Drinking Purpose

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KEYWORDS

amount, parameters, duration, adversely

ABSTRACT:
Present paper deals with the assessment of water quality of Gagan river in summer season between two year time duration. In Gagan river water quality is adversely effected by improper sewage and effluent discharge from small and large scale discharges, human activities and so on .The result obtained from different parameters studied are pH (6.05-7.83), BOD (18.2-44.15), COD (45-69.55), Alkalinity (263-573), Turbidity (90-200) etc. Each of which is greater or lesser in amount.

Introduction- Water is equally important for every organism, be it a tiny bacterium or a giant animal like an elephant .the anomalous properties of water have been responsible for the origin and evolution of life. We are here on this earth because of the presence of water. On the primitive earth, some 3.5 billion years ago, oxygen was present in negligible amount and the climatic conditions at the dawn of life were not oxidizing in nature as we find them today. Later, oxygen was released in the atmosphere, by simple unicellular organisms, like blue green algae.

Water is undoubtedly the most abundant and the most accessible compound in nature. Ironically, though it is one of the most studied chemical compounds, it is perhaps the least understood. Its omnipresence and abundance make us often think of it as a mere space filler. Some also mistakenly consider it as an inert compound since it is colorless, odorless and bland in taste. But today we know that it is a highly reactive substance with several extraordinary properties, which have been crucial for the origin and evolution of life on earth.

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 were used. Collection of water samples for measuring the DO was taken in between 6 A.M. to 8 A.M. from the surface of river. The hydrogen ion concentration (pH), DO, alkalinity, turbidity, transparency, BOD, COD, etc were determined by following standard methods (APHA, 2005). A celcius thermometer (scale ranging from 0^oC to 100^oC) was used to measure air and surface water temperature. Digital electrode pH meter was used for measuring the pH of water. The chemicals used for analysis of all the water parameters were all of analytical AR grade. TDS will be measured with the titration method in laboratory. Alkalinity will be determined by physical method. Then finally we got results that calculated by taking 3 consecutive readings for titrimetric analysis.

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Result and Discussion-

	Temperature (^{O}C)		Transparency (cm)		pH	
	2017	**2018**	**2017**	**2018**	**2017**	**2018**
Site A	34.5	34.96	17.02	18.88	6.625	6.05
Site B	33	33.60	15.02	14.85	7.64	7.82
Site C	33.5	34.1	15.10	15.01	7.575	7.709
Site D	28.5	29.98	13.76	12.8	7.758	7.83
Site E	34	34.5	15.22	15.97	7.385	7.44
	Nitrate(mg/l)		**Total Dissolver Solids(mg/l**		**Dissolved Oxygen(mg/l)**	
	2017	**2018**	**2017**	**2018**	**2017**	**2018**
Site A	1.4	1.25	202.5	223.5	5.45	6.85
Site B	0.726	0.788	105.5	140.5	6.75	8.95
Site C	1.01	1.15	121	188.5	6.35	8.38
Site D	0.815	0.743	35.5	75.80	7.65	10.05
Site E	1.06	1.24	173.5	193.2	6.25	8.25
	B.O.D(mg/l)		**C.O.D.(mg/l)**		**Electrical Conductivity**	
	2017	**2018**	**2017**	**2018**	**2017**	**2018**
Site A	43.3	44.15	65	69.55	936	1001
Site B	26	26.90	48.5	49.90	750	775
Site C	32.5	33.40	49.6	52.2	802	796
Site D	18.2	19.7	45	45.5	595	625
Site E	37.9	38.70	63	65.5	836	857
	Turbidity(NTU)		**Alkalinity(mg/l)**		**Calcium(mg/l)**	
	2017	**2018**	**2017**	**2018**	**2017**	**2018**
Site A	150	200	263	382	22.04	18.06
Site B	120	110	500	545	17.529	10.22
Site C	135	175	431	527	16.023	11.23
Site D	90	97.5	502	573	10.02	6.86
Site E	150	185	317	471	20.04	16.79
	Total biomass(mg/l)		**Color**			
	2017	**2018**	**2017**		**2018**	
Site A	1.58	1.21	Dirty white		Off white	
Site B	4.198	3.978	Almost black		Almost black	
Site C	4.104	3.333	Almost black		Almost black	
Site D	4.36	3.990	Almost black		Almost black	
Site E	3.199	3.990	Almost black		Almost black	

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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 5.45 mg/l to 10.05 mg/l by analyzing the samples from five different sites in summer 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 35.5 mg/l to 223.5 mg/l in the summer 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 28.5^{o}C to 34.96 ^{o}C during two year research period in summer 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 90 to 200 mg/l in summer 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 595 µmoh /cm to 1001µmoh /cm in summer season.

Alkalinity**:** The capacity of water to neutralize strong acid is known as alkalinity. During summer season the higher value i.e 573 mg/l and lower value i.e 263 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 6.86 mg/l to 22.04 mg/l during research period in summer season.

Chemical Oxygen Demand: The amount of oxygen consumed by oxidisable organic substance is COD. In the present study, COD value varies from 45 mg/l to 69.55 mg/l in summer 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 18.2 to 44.15 in summer season.

pH- pH gives an idea of the concentration of hydrogen ions, which in turn 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 6.05 mg/l to 7.83 mg/l by analyzing the samples from five different sites in summer 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 summer season of year 2017 and 2018 the limit of nitrate lie in between 0.743mg/l to1.25 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 1.21 mg/l to 4.36 mg/l.

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