ASSESSMENT OF PHYSIOCHEMICAL AND MONITORING OF DIFFERENT PARAMETERS OF THE UPPER GANGA CANAL WATER TO PRESERVE THE BIODIVERSITY OF THE CANAL

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ABSTRACT

The upper ganga canal is main source of irrigation for region between the ganga river and the Yamuna river in India .Today the upper ganga canal is the source of agricultural prosperity in much of their states (Uttar Pradesh) actively maintain the canal system .Upper ganga canal is the real ganga canal ,which basically starts at the bhim goda barrage near har ki puri at haridwar and go through meerut bulandsahar and continues to nanav in Aligarh district where it bifurcated into the Kanpur and Etawah branches consequently the consumption of water by human and the biodiversity of water puts lives and livelihood at risk because water does not contain substitutes .There are many source of water pollution which includes waste from many types of industries like construction site mining chemical food and its allied processing industry radioactive waste from power generating industries and many agricultural waste .Today the purification of water is taken in whole world but at high cost of money but in future various research will be conducted for economical technology for purification of water at cheaper cost.

Keywords : BOD , COD, pH , TDS, Conductivity, Hardness, D.O.

INTRODUCTION

Water is type of chemical and physical substances which is basic need for every living organism to survive on the planet .every cell of organism need water for performing normal body function .the earth contains 71% of water part mostly sea water and other large water bodies with 1.6% of water below ground in aquifers and 0.001% as air in the vapor [1].Some researcher may estimate that till coming 2025 half of the world population will face fresh water based vulnerability ,this situation is called water crisis by united nation[2] .A recent report said till 2030 the demand of fresh water supply would exceed supply by 50%. [3] further more existing fresh water resources are generally polluted and unavailable due to human or industrial activity .world wide .the increasing contamination of fresh water system with many industrial and natural chemical compound is one of the key environmental problem which failed by humanity[4].

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In many part of the world water is the crucial and precious type of commodity. Some research found and indicated 80% of the world population is exposed to high levels of threat to water security[5] . The work studies on river ecology and pollution gained momentum heavily 1940 [6] studied the algal ecology of the river Hooghly at Kolkata.Urban environmental health problems are favorable symptoms of the challenges facing world especially in developing countries having many problems regarding water pollutions[7]. Basically wastewater is type water that has been adversely polluted in quality by anthropogenic influence. it contain liquid waste discharged by domestic source , commercial sources , industry and agricultural sources. In the most common sources, municipal waste water that contains a broad spectrum of contaminants discharged from the mixing of the waste water from different sources[8]. Waste water discharged from agricultural and food processing industry has different characteristics that waste different in quality from common municipal waste water managed by public waste water treatment plants throughout the world. Basically the waste is biodegradable and nontoxic but it has high concentration of (biochemical oxygen demand (BOD) [9]. In many places sometimes, industrial wastewaters are treated partially before their discharged into anywhere [10]. Today recent attention has been highlighted on the development of more influential , low cost, easy methods for waste water treatment without disturbing environment and human health by treatment itself [11]. Many studies have been undertaken to find economically affordable alternatives for water waste treatment. Many methods such as coagulation, membrane process, adsorption, dialysis, photo catalytic degradation and biological methods have been used for the removal of toxic pollutants from water and waste water [12]. Due to the properties of chemical mixtures available in waste water simple conventional waste water is not always sufficient to remove the entire contaminant load. To control disinfection steps such as chlorination have been applied to control human pathogens. There most cost treatment process are very effective at eliminating most unwanted pathogens and many chemicals [13]. In recent years, semiconductor path catalytic methodology , a low cost and feasible, environmental friendly and sustainable treatment technology to add with "zero" scheme in the waste water industry has been widely used [14]. Activated carbon is completely investigated adsorbent in water treatment process [15]. Now a days "adsorption" method has been popularized as compare to "biosorption" which uses biomaterials as the adsorbent for waste water treatment [16] [17]. Water treatment, water reclamation and reuse, nutrient recovery and recycling and so on. Portable water is essential need of the every living organism including (human).this is the main source for the survival of the human water is collected from many sources like river ,lakes ,ocean and ground water state authority provides water to the people .In 2010 united nation general assembly passed a resolution to make water and sanitation as right[18]. In case of M.C. Mehta V Union of India the target duty of judiciary to reinforce the right to pollution free water is implicit where many industry like tannin industries located on the bank of the river ganga were alleged to be polluting the river .The national green tribunal at 2010 became a act which provides the institution at national level to preserve the natural resources[19].
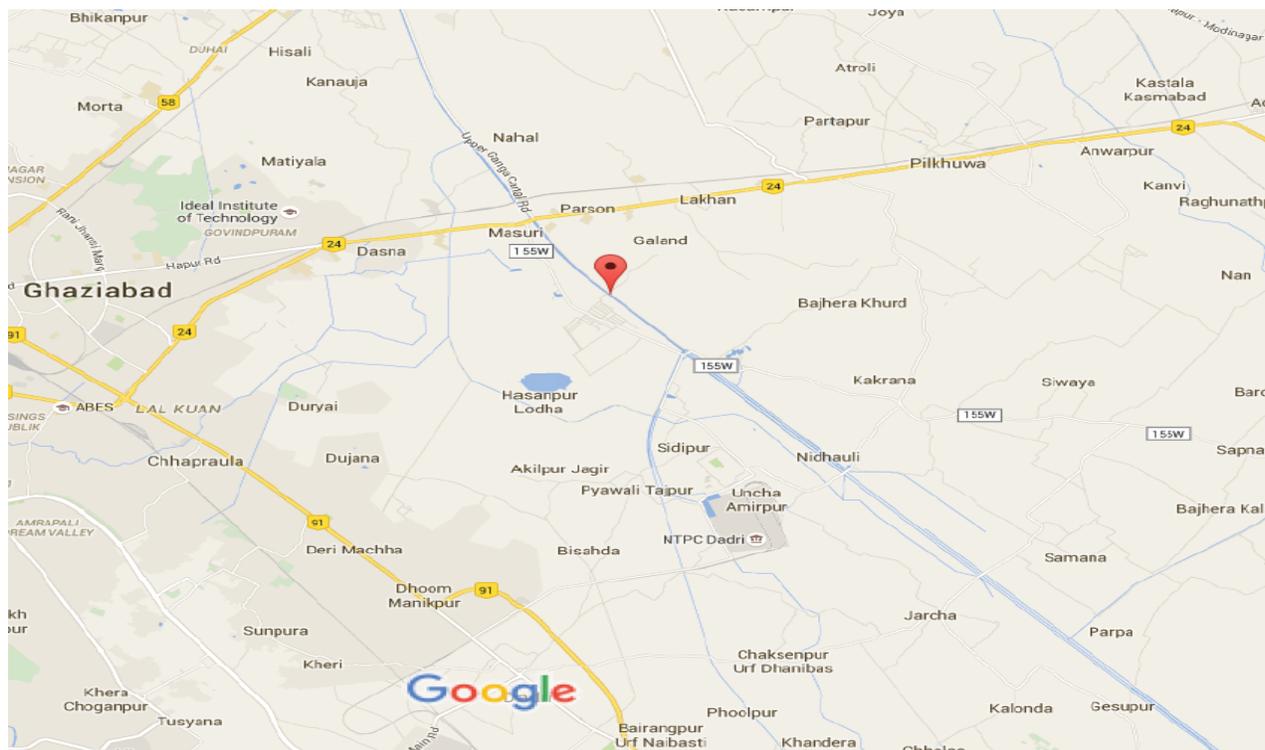
Fig 1: Upper ganga canal (Kherali)

Source : Google Map

MATERIAL& METHODS

The research study was carried out in upper ganga canal in western up in India.

Collection of water: I collected water from upper ganga canal with different station. Basically I choosed 3 station for research study.

Physiochemical analysis:

1. **Hydrogen ion concentration:** collection has be assessed by the pH indicator solution. pH is basically negative log of hydrogen ion concentration which is a measure of acidity and alkalinity of the solution.10 ml of water sample was taken and the electrode was dipped in sample .pH was recorded which was **8.42**.

2. **Total Dissolved Solids (TDS)** : It is defined as the sum of all organic and inorganic constituents which is present in the liquid in the suspended form. The TDS measurement

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was carried out with the help of Electrical Conductivity meter . In this washed filter paper was taken and the dry evaporating disk was pre weighed . The sample was stirred properly and the filtration and washing was performed and then the sample was transferred to pre weighed petri plate . It was allowed to cool for some time and then again weighted.The reading of TDS was recorded and it was **12.25 mg/lt.**

3. **Chemical Oxygen Demand (COD):** Chemical Oxygen Demand is defined as the amount of oxygen required to chemically oxidize the organic constituents present in the water.Basically Potassium dichromate ,concentrated sulphuric acid , mercuric sulphate was required for the reagents and the COD and three COD vials were taken and in two vials sample was taken the remaining vial was kept blank and to the vials 2.5ml of potassium diochromate and 3.5ml of conc. Sulphuric acid was added. The COD digestor was switched on and the temperature was set to 150^0C for two hours and after this U.V spectroscopy was performed . The reading of COD was recorded and it was **20.12mg/lt**.

4. **Conductivity (Specific conductance)** : Conductivity of a solution is defined as the capability to conduct electricity and it is measured in term of Siemen/meter. Conductivity varies as the nature of electrolytes varies for example the strong electrolyte have good conductivity when compared to the weak electrolyte.The specific conductance was measured by the help of electrical conductivity meter . Firstly the electrical conductivity meter was calibrated by the help of potassium chloride and then the electrode was dipped in the sample and the reading was recorded to be **20.3μS/ cm.**

Fig 2 : Showing conductivity of sample

5. **Salinity :** It basically refers to the saltiness and it is defined as the dissolved salt present in water . Salinity is very important factor for determining the biological chemistry of the water and it reveals various physiochemical properties. Salinity measurement was done by the help of electrical conductivity meter and it was calibrated by the help of potassium chloride. The sample was taken and the electrode was immersed in the sample and the readin was recorded and it was **9.26mg/lt**.

Fig 2 : Showing salinity of sample

6. **Turbidity:** Turbidity basically refers to a liquid which is translucent that is which could not be properly visible to the naked eye. It also helps in determining the water quality level. Turbidity is basically caused because of some irrelevant human activities and due to phtoplanktonic growth. The measurement of turbidity was carried out with help of turbidity meter and the reading was recorded to be 1.28 Nephelometric Unit (NTU).

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Fig 3 : Showing turbidity of sample

7. **Dissolve Oxygen (D.O) :** D.O is defined as the amount of oxygen in gaseous phase present in the solution . The oxygen gas the water environment by the process of direct absorption from the atmosphere . The dissolve oxygen of the sample was recorded by the help of dissolve oxygen meter and the reading was **8.49mg/lt.**
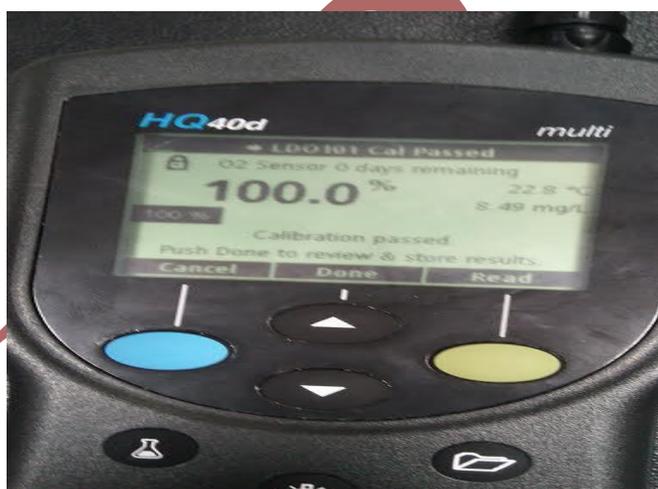

Fig 4 : Showing dissolve oxygen level of sample

8. **Hardness:** Hardness of water is defined as the excess amount of minerals when present in the water in form calcium and magnesium bicarbonates / sulphates . Hardness is also of 2 types. Temporary hardness is due to the presence of calcium bicarbonate or magnesium bicarbonate while on the other hand permanent hardness is due to the presence of calcium & magnesium sulphates. EDTA. Titration was performed to determine hardness and in the sample ammonia buffer and EBT dye was added and in the

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burette EDTA was filled and then the titration was performed . The end point of titration was determined when sample colour changes from wine red to steel blue and the reading was recorded and it was **20mg/lt**.

A   **B**
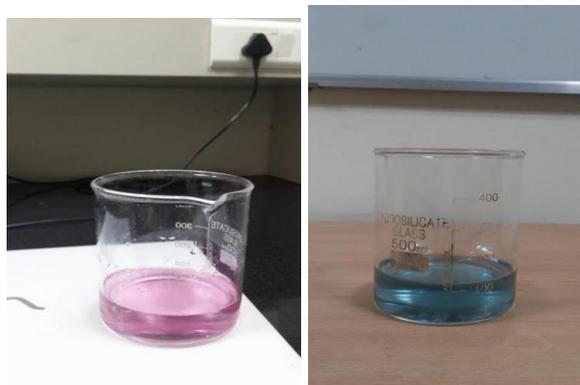
Fig 5 : A - Staring point of titration B- End point of titration

9. **Biological Oxygen Demand (BOD)** : It is defined as the amount of oxygen required by the a required by the microorganism(aerobic) for the complete breakdown of the organic matter which is dissolved in the water and the breakdown of organic matter occurs at a certain temperature at a specific time span. The BOD value of the sample was 78.4±1.49 mg-[1].

RESULTS

S.no	Test Sample	Value
1	Hydrogen ion concentration	8.42
2	Total Dissolved Solids (TDS)	12.25mg/lt
3	Chemical Oxygen Demand (COD):	20.12mg/lt
4	Conductivity (Specific conductance)	20.3μS/cm
5	Salinity	9.26mg/lt
6	Turbidity	1.28NTU
7	Dissolve Oxygen	8.49mg/lt
8	Hardness	20 mg/lt
9	Biological Oxygen Demand	78.4±1.49 mg-[1]

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CONCLUSION

According to the current prospective it is very essential for taking some major steps for solving the environmental issues and it is very essential to interact with the governmental bodies for development of innovative ideas to solve the water pollution problems. The upper Ganga passes through the western part of Uttar Pradesh which fulfils the requirements of daily need of water consumption for agricultural, irrigation and drinking water supply so it is mandatory to carry out various physiochemical test to be update regarding the biological chemistry of this river to keep the aquatic environment free from pollution.

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