



### **3. An Assessment on Organic Pollution Level From Different Sources Of Water Bodies At Buxar District, Bihar.**

**Dr. Govind Kumar, Ravinish Prasad**

*Post Graduate Teacher.*

*College: +2 M.P. High School,  
Buxar Bihar.*

#### **ABSTRACT**

*Any water body is characterized by its physico-chemical parameters. These parameters decide the water quality of that water body and also indicate the organic pollution level. The recent research was carried out to investigate the organic pollution level from different water samples of different water bodies at Buxar district, Bihar. For this purpose, 20 water samples viz. river Karamnasa (5 samples), river Ganga (5 samples), municipal sewage water (5 samples) and tube well water (5 samples) were collected from different localities. All the samples were subjected to analyse water quality parameters like pH, DO, BOD, COD and Chloride by standard method of APHA. The result obtained through this research describes that municipal sewage water is maximum organically polluted as BOD level is maximum i.e, 7.2 mg/l to 9.6 mg/l while tube well water least polluted as BOD level is least i.e, 1.4 mg/l to 1.9 mg/l.*

#### **KEYWORDS:**

*Physico-chemical parameters, Different water sources, organic pollution, Buxar, Bihar.*

#### **Introduction:**

Water is the prime necessity for the growth and survival of all living beings on earth. Rapid growth of population and industrialization, pollution level in water bodies increases drastically. As a result of it, the water sources available for various means such as drinking, aquaculture and agriculture have been contaminated with many organic and inorganic pollutants. Organic pollutants originate from domestic sewage, urban run-off, industrial effluents and farm wastes. Sewage effluents is the greatest source of organic material discharged to freshwaters (WHO, 2004). Inorganic pollutants such as trace elements, minerals acids, metals, metal compounds, inorganic salts, pollute the water bodies. Polluted

water contains solids and dissolved organic compounds that provide shelter and medium for growth of many microorganisms, leads to aquatic system depletion, environmental degradation and also affect human health. Sewage water contains approx. 99.9% water, 0.03% of suspended and other soluble organic and inorganic substances.

Several studies have been done to assess the organic pollution status of river bodies and also the impacts of these pollutants in changing the physico-chemical and biological features of river bodies by Caldwell (1935), Trivedy(1984), Singh(1999), Srivastava (2002), Singh(2003), Shaikh(2004), Bhandari(2008), Ahmed(2010), Pathak(2011), Kumar(2015) and Kumari(2020). Keeping this on mind, a research was done to assess organic pollution level from different sources of water bodies at Buxar, Bihar.

### **Material and Method:**

Buxar district is located in the South-west part of the state Bihar and occupies an area of 1703 sq. kilometer. Buxar is boarded by Rotas and Kaimur districts to the South and by Bhojpur district to the east. River Ganga and river Karamnasa forms North and West boundary respectively. River Karamnasa is one of the largest and perennial river of Buxar. It flows North-Westernly and joins the river Ganga at Chausa(Buxar).

To analyse organic pollution level a distance of 5 km was studied that stretches the entire length of river passing through Buxar district upto the confluence with river Ganga. River Ganga is most holy river of Hindus and is also a life line of millions of people who live along its course and depend on it for their daily needs. The Ganga enters Buxar from South direction and flowing South-north direction for about 4 km and then changes its course to west-east direction. A distance of 4 km from Central jail, Buxar to the village Sarimpur was studied for analyzing organic pollution level. Buxar town is well surrounded by homes, schools, colleges, hospitals and temples. This feature contribute in the formation of municipal sewage water. Such sewage water contains many organic and inorganic pollutants. A distance of 4 km was studied for sampling and analyzing of organic pollution level. Tube well water was also collected from different sampling sites stretches a distance of 4 km.

20 water samples viz river Karamnasa (5 samples), river Ganga (5 samples), municipal sewage water (5 samples) and tube well water (5 samples) we're collected from different sampling sites. Different samples of water bodies were immediately transferred to laboratory and subjected to physico-chemical analysis as per standard method of APHA (2005). BIS standard was also considered. pH meter was used to find pH of water samples. Winkler-Idometric method was used to calculate DO content. BOD and COD were calculated by titration method. Chloride value was found by titration of samples with silver nitrate solution.

### **Result and Discussion:**

For deciding the water quality and organic pollution level of a water body, its physico and chemical parameters are important factors (Kumar, 2015). The average value of physico-chemical parameters of different water samples are tabulated in following table-

**Table-1: Average value of physico-chemical parameters of water samples of different sources**

Source	pH	DO	BOD	COD	Chloride
BIS Standards	6.5	10	30.0	250.0	250.0
River Karamnasa	7.2-8.1	6.2-8.0	2.4-4.6	5.7-12.5	52.2-53.1
River Ganga	7.0-8.2	6.6-8.3	2.8-6.9	10.1-11.9	46.3-52.3
Municipal sewage water	6.4-7.3	3.6-4.2	7.2-9.6	70.3-94.5	72.1-76.3
Tube well water	7.0-7.1	9.2-9.7	1.4-1.9	3.2-4.1	1.6-2.0

The above table shows that pH of different samples from all the sources was ranged between 6.4 to 8.2. The pH value of municipal sewage water indicates that this water is quite acidic than other samples. Tube well water is more suitable for aquatic life. DO of any aquatic body directly influences the growth of flora and fauna (Bhandari,2008). In recent study the DO content of different water samples ranged from 3.6 mg/l to 9.7 mg/l. The most highly oxygenated water was tube well water, having DO 9.2 mg/l to 9.7 mg/l. The minimum DO was present in the samples collected from municipal sewage water ranged from 3.6 mg/l to 4.2 mg/l. The water with DO content less than 4 mg/l is highly contaminated with organic pollutants and not appropriate for aquatic life. BOD value of present investigation was ranged from 1.4 mg/l to 9.6 mg/l. Municipal sewage water contains maximum BOD value i.e, 7.2 mg/l to 9.6 mg/l while minimum BOD value was 1.4 mg/l to 1.9 mg/l of tube well water. BOD is the measurement of amount of organic matter that can be biologically oxidized.

If large quantity of organic waste present in water sample, there will be also a lot of bacteria present in the sample to decompose organic waste (Kumari,2020). As a result, the demand for oxygen to oxidize will be high and BOD level will start to decline. More BOD level indicates the sample is fully loaded with organic pollution (Singh,2003). COD value of present research was ranged from 3.2 mg/l to 94.5 mg/l. Tube well water has a minimum COD value i.e, 3.2 mg/l to 4.1 mg/l. While, municipal sewage water contains maximum COD value i.e, from 70.3 mg/l to 94.5 mg/l. COD gives us a reliable parameter for judging the extent of pollution in water (Srivastava, 2002). It is also the measure of chemical oxidation of organic matters. COD value of present investigation was maximum in municipal sewage water which indicates that this water is full with organic pollutants. Chloride value of different sampling sites was ranged from 1.6 mg/l to 76.3 mg/l. Maximum chloride value was recorded in the samples of municipal sewage water, ranged from 72.1 mg/l to 76.3 mg/l. While, it was minimum in the samples of tube well water i.e, 1.6 mg/l to 2.0 mg/l. High chloride value indicates maximum pollution load (Trivedy, 1984).

### **Conclusion:**

In different samples of water bodies collected from different sources, the level of organic pollutants were examined by examining physico-chemical parameters viz, pH, DO, BOD, COD and chlorides. The contamination with organic pollutants is much more in municipal sewage water sources while it was minimum in tube well water. Thus, the present research conclude that municipal sewage water is maximum organically polluted in comparison to other water sources. Tube well water is least organically polluted.

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