

Physico-Chemical Parameter of River Ajnal at Harda (M.P.)

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ABSTRACT

Rapid Industrialization and urbanization affect the natural system including water. Ajnal river is a small river of Harda (M.P.). In the recent decade it was polluted and become a Nalla. Sample was collected from the River Ajnal at three different sites of town Harda in different season. Research work divides on three different season winter, summer and monsoon in the year 2018 to 2019 and analyzed the physicochemical parameters Temperature, transparency, pH, alkalinity, water hardness, DO, etc. average water quality of the river was observed during research work.

KEYWORDS: Industrialization, polluted, physico-chemical, Season, Parameters

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INTRODUCTION

For the development of human and growth of industry the river water is highly considered to be the main requirement. For drinking purpose the need fresh water increase in last decay. This need fulfilled by the river water. Besides the River water use for Domestic use, Agriculture and Fishery. It means water is most abundant compound of the ecosystem. On our earth 70% of water are available but only 3% of water is for drinking but due to west discharged increased human and industrialization, agriculture and men made activity. The quality of river water is highly polluted with harmful contaminates which affect human as well as aquatic life so the river water should be checked at regular time interval because due to different type of contaminations as like human waste, industrial fluids and heavy metal from electric discharge etc are causes varied of water born diseases like diarrhea, hepatitis, stomach disorder etc this type of contamination affect ecosystem and changed the parameter of river water like Colour, Temperature, pH, DO, BOD, TDS, Turbidity, Alkalinity, Total Hardness, Chloride, Calcium, Magnesium, etc. This parameter are shows the quality of water it the change in this then the water is contaminated.

Material and methods

Study area- Harda is a district of Madhya Pradesh it situated on the south west region of Madhya Pradesh. The geological coordinate of Harda is 21°54' and 22°36N and 76° 46' and 77° 30'E. River Ajnal is parallel flow to town Harda, its flow is east to west. This river is a small tributary of river Narmada. River Ajnal was life line of Harda town, but in the recent decade it becomes a Nalla, because sewage entered in the river and more anthropogenic activity. The quality of River water directly depends on their physico-chemical parameter.

Sample was collected from the River Ajnal at three different sites of town Harda in different season. Research work divides on three different season winter, summer and monsoon in the year 2018 to 2019. Sample was collects in two 500ml plastic bottle, one for testing of physicochemical parameters and second for DO determination. Collected sample analyzed in the chemistry lab by the following of Adoni (1986) and APHA (1992) standard methods.

Results and discussion

S No.	Parameters	Winter	Summer	Monsoon
1	Temperature (°C)	22	32.5	29.5
2	Transparency (m)	1.5	0.9	0.5
3	pH	7.5	9.5	8.5
4	Total Alkalinity (mg/l)	174	285	200
5	Chloride (mg/l)	15	09	19.5
6	Calcium (mg/l)	28	61.2	53.6
7	Magnesium (mg/l)	7.06	5.02	11.04
8	Total Hardness (mg/l)	155	213	193.5
9	Dissolve Oxygen (mg/l)	5.42	3.20	4.82

Temperature – The temperature peak was recorded in summer (32.5 °C) and the lowest temperature recorded in winter (22 °C). This both are related with atmospheric temperature and physical, chemical and Biological factor of aquatic system.

Transparency - transparency shows the clarity of water, transparency is an important limiting factor in the growth and distribution of flora and fauna (Salahuddin 2014). The Secchi transparency gradually increase from 0.5m to 1.5 m minimum 0.5 m was recorded during monsoon due to drainage of rain water were added in river including mud and dusts particle. It's directly related to rate of photosynthesis clearly of water are support to the penetration of light.

pH - Due to human activity sewage and industrial drainage increasing the sulfur and chloride contain in the river water. High range of pH 9.5 was observed during summer aquatic autotrophs using CO₂ during the photosynthesis in this duration decrease the CO₂ and reducing H⁺ (Bano *et al.* 2015) and lowest value 7.4 were recorded during winter season due to decrease photosynthesis.

Total Alkalinity (mg/l) - (from Arabic "al-quail") alkalinity is the total concentration of basic radical like CO₃²⁻, HCO₃⁻ etc its change in pH. High range of alkalinity 285 mg/l was recorded during summer and lowest values 174mg/l were recorded during winter

Calcium (mg/l) - High range of calcium 61.2mg/l was recorded during summer and lowest value 28mg/l were recorded during winter season. It determines the hardness of water because it can be found in water as Ca²⁺ ion.

Magnesium (mg/l) - Magnesium and calcium metal always responsible for water Hardness. High range of magnesium 11.04mg/l was recorded during monsoon and lowest value 5.02mg/l were recorded during summer season. If Mg ion concentration is more in water then it hard to use.

Chloride (mg/l) – chloride is an important parameter associated with the quality of water. Chloride is non toxic to human. So it is also use for water treatment. High range of chloride was recorded during winter and lowest values were recorded during summer season due to human activity, sewage, industrial drainage was added in river including mud and dusts particle. It's indirectly related to rate of hydrogen ion (pH) concentration clearly pH increase then chloride will be decreases.

Total Hardness (mg/l) - Calcium, magnesium, carbonates, bicarbonates, chloride and organic matter together associate and forms hardness of water. According to hardness scale by water quality association (Sharma *et al.* 2014) Hardness value range 0 to 17 mg/l is soft water, 17 to 60 mg/l slightly hard, 60 to 120 mg/l moderately hard, 120 to 180 mg/l hard water and more than 180 mg/l very hard. High range of Total hardness 213mg/l was recorded during summer and lowest value 155 mg/l were recorded during winter season.

Dissolve oxygen (mg/l)- DO gives direct and indirect information about bacterial activity (Vikal 2009). Dissolve oxygen is free oxygen which soluble in water it increase water quality it's free oxygen support to biological system of water. High range of DO 5.42 mg/l was recorded during winter and lowest value 3.20 mg/l were recorded during summer season. DO inversely relate to the temperature.

Several physico-chemical and biological parameters and their variability have been studied in river water. The chemical analysis showed that pollution contained high values of chloride, total hardness, total alkalinity and low value of dissolved oxygen, which indicates a high pollution level in the river water. Higher chloride indicates the urban activity in river water in Harda. These studies also have resulted in several policy changes and strict regulatory measures for water quality maintenance in the river system.

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