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PHYSICO-CHEMICAL STUDIES OF NARMADA WATER- (KHEDIGHAT, BARWAHA, M.P.) WITH SPECIAL EMPHASIS ON THE EFFECT OF DISTILLERY EFFLUENT

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ABSTRACT: The study on some physico-chemical characteristics of River Narmada at its source has been calculated for the period of two year (April 2011 to March 2013). The sampling points were selected on the basis of their importance. Analysis of some physico-chemical characteristics like water temperature, pH, TS, TDS, TSS, DO, BOD, COD, Chloride and Potassium has been done during the investigation period. During the Study points IV, V and VI showed higher significant value of TS, DS, SS, BOD, COD and K. However, p^H was low and almost acidic in these points. While DO was absent from these points. The Narmada River has been facing severe anthropogenic activities, mostly due to municipal sewage and industrial distillery effluent and dense population etc.

KEYWORDS: Distillery effluent, DO, BOD, Narmada River, Anthropogenic activity

INTRODUCTION

Limnological study of any water body essentially constitutes analysis of all physical, chemical and biological factors that influence the life in water. Water plays an important role in the existence of life on the earth. All life has been originated in the water. The River Narmada along with its tributaries is considered the lifeline of the State of Madhya Pradesh India. In the recent times the ecology of River Narmada is seriously affected by the domestic sewage discharge, effluents from different industries located near the banks and by dam formation.

Narmada River is one of the most important rivers, which discharge into the industrial effluent. Some of the important sources of pollutants in the Narmada River are agricultural waste from the surrounding agricultural field, municipal sewage and solid waste from Omkareshwar Town, The aquatic ecosystem consists of several components which are directly or indirectly affected by pollution (CPCB, 1995). Today due to various anthropogenic activities, the river water usually receives untreated sewage, domestic waste, industrial and agricultural effluents that results in pollution of several rivers in India and abroad.

MATERIAL AND METHODS

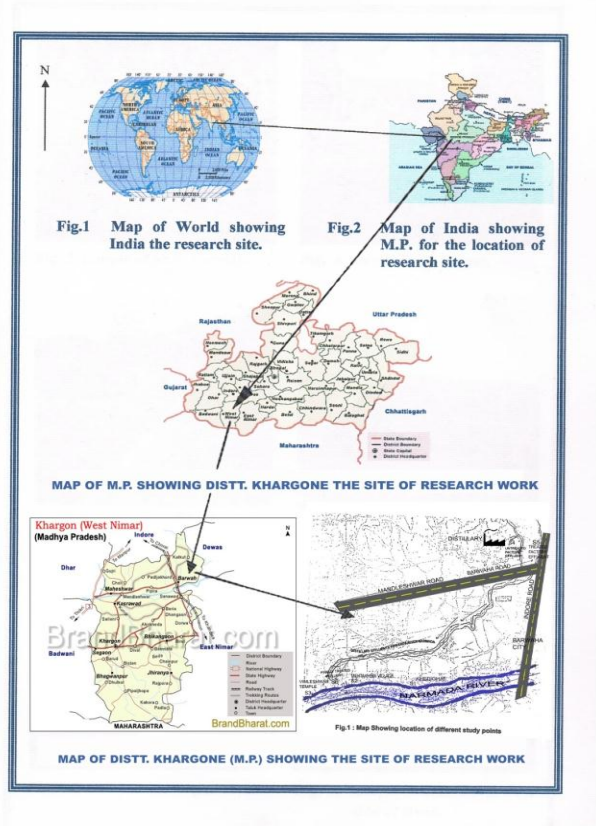
Description of Narmada

Narmada is the fifth largest river of India. It is commonly known as the Life line of Madhya Pradesh. The major part of Narmada river (88%) flows in this state. It originates from Amarkantak of eastern MP and it flows towards West and joins Arabian sea at Bharuch in Gujarat. It forms the traditional boundary between North India and South India and flows westwards over a length of 1,312 km. before draining through the Gulf of Cambey (Khambat) into the Arabian Sea, 30 km west of Bharuch city of Gujarat.

Present study was carried out at following different six study points:

- Study Point I:- This point is situated in River Narmada at Khedi Ghat, which is 700 meter before the effluents discharge, from the respective factory into the river.
- Study Point II:- It is situated in the River Narmada at Mehta Khedi Village where mixing of effluent takes place.
- Study Point III:- This point is situated in River Narmada near Vimaleshwar Temple 500 meter after the effluent mixing point.
- Study Point IV:- It is situated in the vicinity of factory actually it is Untreated factory effluent.

- Study Point V:- It is Treated effluent of factory also situated in the vicinity of factory.
- Study Point VI:- It is Finally treated effluent at factory which is ultimate discharge into the river.



- **Water analysis**

The water samples were collected from the four Water samples were collected and analyzed for physic-chemical parameters and effect of distillery effluent studies at all stations.

- **Analysis of physico-chemical parameters:**

In the analysis of the physico-chemical properties of water, standard methods prescribed in limnological literature were used. The Apperence, Odur, water temperature, pH, Dissolved Oxygen were determined at the site while Total Solid, Dissolved Solid, Suspended Solid, Chloride, BOD, COD and Potassium were determined in the laboratory.

- **Methods for analysis of physic-chemical parameters:**

The various physico-chemical parameters were determined adopting methods given by Adoni (1985), Trivedy and Goel (1986) and APHA (2005).

RESULTS AND DISCUSSION

The present study was conducted for the period of two years i.e. from April 2011 to March 2013. Details of observations of Physico- chemical parameters are as follows:

The following Physico-chemical parameter was observed.

- Temperature being the most important factor was found vary from 15OC to 33.4OC. The Temperature 15OC was obtained at study point I December 2011 while maximum Temperature 33.4OC was observed at study point III May 2012.
- Appearance of water is considered as first basic sign of pollution. In study point I, II and III. Water was in three visible form i.e. clear (April, May) muddy (May to October) and slightly green (November to March), while at study point IV, V & VI it was unpleasant which reflects its polluted nature.
- Odur at study point I, II and III was absent (odourless), while at study point IV, V and VI it was unpleasant which reflects its polluted nature.
- pH being the most important factor was found vary from 3.1 to 8.9. The pH 3.1 was obtained at study point IV November 2011 while maximum pH 8.9was observed at study point III January 2013. at study point I,II and III was always towards alkaline (7.3 to 8.6) while at study point IV, it was found on the acidic scale (3.0 to 4.3), however, at study point V and VI. It showed mixed nature (5.0 to 7.8).
- Total Solids being the most important factor was found vary from 245 to 375975. The Total Solids 245 was obtained at study point I December 2011while maximum Total Solids 375975 was observed at study point IV February 2013. value at

study point I, II and III was on lower range (248 to 840 mg/l), while on the study point IV, V and VI, it was on very higher range (42862 to 375975 mg/l).

- Dissolved Solids being the most important factor was found vary from 145 to 132477. The Dissolved Solids 145 was obtained at study point III January 2012 while maximum Dissolved Solids 132477 was observed at study point IV February 2013. Also showed similar pattern. Lower range at I, II and III (140 to 440 mg/l) and higher range at IV, V and VI (34938 to 134573 mg/l).
- Suspended Solids being the most important factor was found vary from 26 to 244312. The Suspended Solids 26 was obtained at study point I December 2012 while maximum Suspended Solids 244312 was observed at study point IV February 2013 also showed similar pattern. Lower range was observed at I,II and III (23 to 610 mg/l) and higher range was at IV, V, and VI (2190 to 211117 mg/l).
- Chloride being the most important factor was found vary from 10 to 15400. The Chloride 10 was obtained at study point I October 2012while maximum Chloride 15400 was observed at study point V November 2012. Values were low at study point I, II & III ranged in between 11 to 60 mg/l, however its values were on higher range at IV, V and VI study point (3200 to 15400 mg/l).
- Dissolved Oxygen is very important parameter for living organism specially. It ranges 4.3 to 12.4 mg/l at study points. The Dissolved Oxygen 4.3 was obtained at study point II February 2013 while maximum Dissolved Oxygen 12.4 was observed at study point I November 2011. at study points I, II & III however it was wanting from the study points IV,V and VI.
- BOD values ranges in between 2.4 to 59800 mg/l at study points. The BOD 2.4 was obtained at study point I January 2012 while maximum BOD 59800 was observed at study point IV February 2013. at study points I, II and III, however, study point IV, V and IV showed very higher range (4000 mg/l to 59800 mg/l).
- COD values ranges in between 10 to 160000 mg/l at study points. The COD 10 was obtained at study point I January 2012 while maximum COD 160000 was observed at study point IV February 2013. trends also corroborate with the BOD i.e. higher range was at study points IV, V and VI and lower range at I, II and III study points.
- Potassium is an important parameter as for as the physiology of organism is concerned. Its values ranges in between 0.28 to 8600 mg/l at study points. The Potassium 0.28 was obtained at study point I July 2011 while maximum Potassium 8600 was observed at study point IV February 2013. It range (0.28 to 4.20 mg/l) was very low at study points I, II and III and very High (1000 to 8600 mg/l) at study points III, IV, V and IV.
- Study points IV, V and VI showed higher significant value of TS, DS, SS BOD, COD and K. However, pH was low and almost acidic in these points. While DO was absent from these points. This showed that distillery effluent may put adverse effect on the water quality of river. Important point noted in these study points was that above pollution parameters are too high in comparison to recommended standard value. These further the present distillery in not following proper treatment of effluents. Hence, a proper treatment is needed to save the limno – chemistry of river Narmada and Life of the aquatic organism directly and indirectly to human being in that particular environment.

River pollution in India has now reached to a point of crisis due to unplanned urbanization and rapid growth of industrialization. The entire array of life in water is affected due to pollution in water. The problem of water quality deterioration is mainly due to human activities such as disposal of dead bodies, discharge of industrial and sewage wastes and agricultural runoff which are major cause of ecological damage and pose serious health hazards. The degree of pollution is generally assessed by studying physical and chemical characteristics of the water bodies (Duran and Suicnz 2007). Studies related to water pollution of rivers like Cauvery (Batcha, 1998), Ganga (Rao et al., 2004) have received greater attention from time to time and during recent years.

CONCLUSION

The physico-chemical studies with seasonal and monthly changes under different vibrating conditions provide enough understanding to manage any water body for multipurpose use. The catchments of river have

measurable impacts in the submergence area its activity are directly and indirectly affect the quality of water.

Industrial distillery effluants are affecting the Ichthyofauna either directly or indirectly. Most of the industries discharge their waste without proper treatment which cause change in physical, chemical and In biological characteristic of water. The release of untreated industrial effluents into aquatic system seriously affects aquatic biota and their production. The deterioration of water quality day by day is due to the discharge of untreated effluents, which demand urgent measures to assess pollutions.

Industrial Effluents entering the water bodies is one of major sources of environmental toxicity. It not only affects the quality of drinking water but also has deleterious impact on the soil microflora and aquatic ecosystems. Industries keep on releasing effluents, which is quite toxic whether its sugar mill or fertilizer industries, or chemical treatment given to the river also cause problems for the survival of the Narmada river fauna and flora.

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