



Comparative Study of Heavy Metals on Chilar and Lakhundar Dam at Shajapur District, MP, India

Bodane Arun Kumar

Department of Chemistry, B.S.N. Govt. P.G. College, Shajapur, M.P., 465001, INDIA

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Abstract

The heavy metals pollution is a big and most burning problem of India and others countries. The pollution of dam water mainly causes of heavy metals and some others local reason. The heavy metals parameters analyses in this study are Mn (Manganese), Ni (nickel), Cu (copper), Cd (cadmium), Cr (chromium), Fe (iron), Pb (lead), Hg (mercury) and Zn (Zinc). The present study was focused on assess the water quality of dam. The study of heavy metals were estimated in dam water for the session January to December 2013. In the present study result indicates that the Chilar and Lakhundar dam water quality is good and the metal ions were almost within the permissible limits.

Keywords: Dam water, Shajapur, heavy metals, quality of water, water pollution.

Introduction

Water is most essential and basic need for human, plants and animals life. Water is plays a main role in all living being for different vital activities¹. Since last ten years, continuously growing population, techniques of waste disposal and the industrialization have been responsible for heavy metals pollution and contamination of water². Present time pollution of water in India reaches into alarming situation. All resources of water in India have become much more polluted in present time. Shajapur and surrounding village's peoples are depending upon both dam for their domestic needs.

Methodology

Study Area: Shajapur is a district of Madhya Pradesh. The district is placed within the northwestern a part of the Madhya Pradesh state and latitudes 32°06' and 24° 19' North and longitudes 75° 41' and 77° 02' East³. It is part of Malwa plateau spanning over an area of 6,196 km. Shajapur which is district head quarter and located on national highway No. 3 Agra-Bombay road. Shajapur is mainly agriculture based district and their main crops are wheat, Jawar, Soyabean, Bajra, Sugarcane and Groundnut. The total geographical area of the Shajapur district is 6196 sq. kms. The normal annual rainfall of Shajapur District is 104.79 mm and Shajapur district receives maximum rainfall during south-west monsoon period i.e. June to September. About 92.3% of the annual rainfall received during monsoon season⁴.

Chilar Dam: The dam constructed across the river Chilar. The length of dam is 2866m and height is 30.48m. Catchment area of chilar dam is 98.42 Sq. Km, full maximum water level is 456.59, live storage capacity is 31.11mcm and dead storage capacity is 3.68mcm.

Lakhundar Dam: The dam constructed across the river Lakhundar and provides irrigation in an area of 6100 ha (CCA). An ogee shaped weir of length 155 m designed to discharge 628 cumec of flood water on the right flank has been constructed⁵.

In the present study 3-3 dam water samples were collected randomly in rinsed polythene bottles from January to December 2013 in Chilar and Lakhundar dam, District-Shajapur. The concentrations determined were more than the maximum admissible and desirable limit when compared with the national and international organizations like WHO (2008). The heavy metals concentration determines with the help of standard literature procedures⁶⁻¹¹. The important contributions on heavy metals analysis of water were made some other authors¹²⁻²¹.

Table-1
Heavy Metals Analysis for Chilar Dam

Sr.No.	Parameter (mgL ⁻¹)	Water Sample in Chilar Dam		
		Sam.-I	Sam.-II	Sam.-III
I	Cd	0.002	0.004	0.005
II	Fe	0.005	0.004	0.002
III	Zn	0.010	0.013	0.011
IV	Cu	0.002	0.001	0.003
V	Hg	0.000	0.001	0.000
VI	Pb	0.001	0.000	0.000
VII	Cr	0.002	0.001	0.002
VIII	Mn	0.002	0.003	0.004
IX	Ni	0.004	0.002	0.003

Table-2
Heavy Metals Analysis for Lakhundar Dam

Sr. No.	Parameter (mgL ⁻¹)	Water Sample in Lakhundar Dam		
		Sam.-I	Sam.-II	Sam.-III
I	Cd	0.003	0.001	0.002
II	Fe	0.005	0.006	0.004
III	Zn	0.012	0.014	0.015
IV	Cu	0.003	0.001	0.002
V	Hg	0.001	0.000	0.001
VI	Pb	0.000	0.000	0.001
VII	Cr	0.003	0.002	0.001
VIII	Mn	0.001	0.002	0.003
IX	Ni	0.002	0.005	0.004

mg/l. The Hg range is 0.000 to 0.001 mg/l. The Pb range is 0.000 to 0.001 mg/l. The Ni range is 0.002 to 0.005 mg/l. The Cr range is 0.001 to 0.003 mg/l and the Mn range is 0.001 to 0.004 mg/l. The investigation has revealed that the metal ions were almost within the permissible limits in the both dam water.

Conclusion

The investigation has revealed that the metal ions were almost within the permissible limits in the both dam. The obtained result of this study is very useful for the peoples of Shajapur and nearest village's to understand the quality of dam water. The investigation of this study will also helpful in treatment and minimize heavy metals pollution of water in Chilar and Lakhundar dam of District-Shajapur (Madhya Pradesh).

Results and Discussion

The results of present investigation have been reported in given table 1 and 2. The Cd range between Chilar and Lakhundar dam is 0.001 to 0.005 mg/l. The Fe range is 0.002 to 0.006 mg/l. The Zn range is 0.010 to 0.015 mg/l. The Cu range is 0.001 to 0.003

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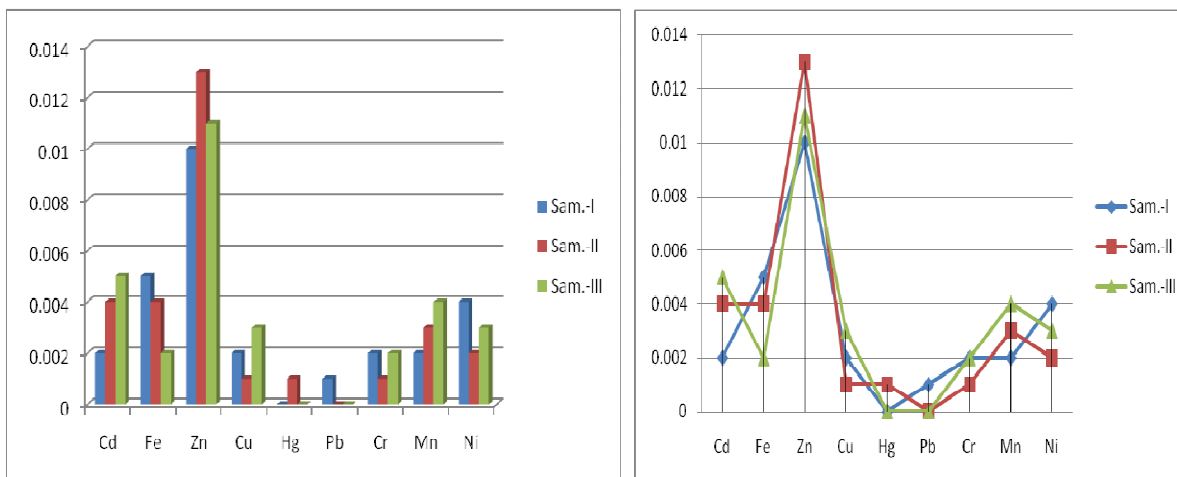


Figure-1
Chilar Dam : Heavy Metals Parameters Graphical Analysis

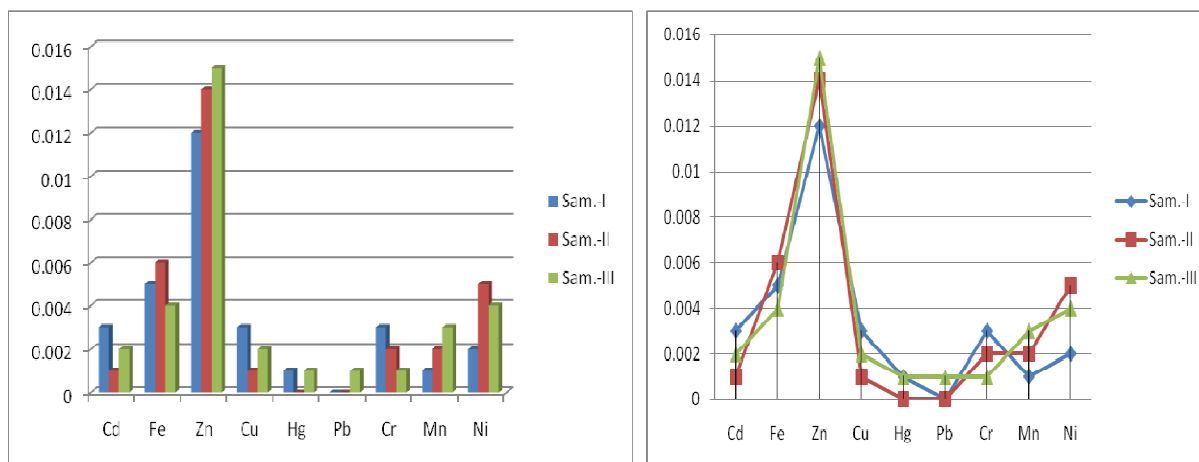


Figure-2
Lakhundar Dam : Heavy Metals Parameters Graphical Analysis

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