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RESEARCH ARTICLE

WATER POLLUTION IN DAMOH DISTRICT - A CRITICAL REVIEW

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ABSTRACT

Damoh is a industrial city. High values of TDS, TH, chloride, alkalinity, calcium and magnesium were found in most of the groundwater samples of surrounding areas and effluent out -let samples of cement effluent treatment plant due to cement industries of damoh and improper treatment of cement effluent treatment plants. Though the CETPs are treating the effluent, the sonar and kopra rivers and the surrounding ground water quality gets deteriorated. This review critically analyses water pollution problems in Damoh, Madhya Pradesh, India

INTRODUCTION

Water sources available for drinking and other domestic purposes must possess high degree of purity, free from chemical contamination and microorganisms. The rapid growth of urban areas has further affected the groundwater quality due to over exploitation of resources and improper waste disposal practices. Also, the effluent from the cement industry are characteristics of waste water released from sizing, desizing, kiering, bleaching, mercerizing, cement house and dusting sections of composite materials of industrial effluent. The wastewater is highly viscous with high suspended solids and total dissolved solids. Damoh town, the head quarter of Damoh district, Madhya Pradesh, India is situated on the bank of sonar and kopra rivers. It is located at 10.95oN, 78.08oE and 39 km from Damoh on southwest direction. kopra river is a tributary of river sonar. It confluence with river sonar at about 12 km downstream of Damoh. During the last three decades the town emerged as a major cement centre.

Review of Literatures

This review has evaluated the various water parameters like Chloride, alkalinity, COD, BOD, hardness, EC and potassium etc., excess in most of the study areas of the following in accordance with the drinking water quality standards suggested by the World Health Organization.

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Soni D.D and Shrivastava, B. K has been made to evaluate the current status of physico-chemical contaminants and their sources in surface and groundwater of sonar river basin. 33 water samples including 11 surface water samples and 22 groundwater samples were collected from different location of sonar river basin during November 2012.The physico-chemical parameters such as pH, EC, TDS, TH, TA, NO3, SO4, PO4, Na, K, Ca, Mg, Cl and F have been analyzed. The results were compared with water quality standard prescribed by ISI/ICMR/WHO and an attempt has been made to find whether the quality of groundwater suitable for drinking purposes or not soni et focused on groundwater quality assessment of some parts of Than Narsingarh and Hatta block in Damoh District, M.P.

Groundwater quality of the study area was evaluated for its suitability for drinking purposes by collecting ten samples during pre-monsoon season August 2013) by adopting standard analytical techniques of APHA (2005). The water samples collected in the stations were analyzed for electrical connductivity (EC), pH, Total Dissolved Solids (TDS), Total Hardness (TH), major cations like calcium, magnesium, and anions like bicarbonate, chloride, nitrate, fluoride and sulphate. The study revealed that some water sources in the region are not suitable for drinking with respect to total hardness, calcium and magnesium content. Proper maintenance and treatment of water can improve the quality of drinking water and thereby a safer life. Various samples of ground water, were collected from different areas in and around the Narsingarh village of Damoh District, India and analyzed for their physicochemical characteristics. The results

of this analysis were compared with the water quality standards of WHO and CPHEEO. In this analysis the various physicochemical parameters such as pH, electrical conductivity, turbidity, total dissolved solids, Cl-, F-, SO42-, NO3 -, Na+, K+, Fe, Cr, calcium and magnesium etc., were determined using standard procedures. The quality of groundwater samples were discussed with respect to these parameters and thus an attempt were made to ascertain the quality of ground water used for drinking and cooking purposes in the sampling areas. Physico – Chemical Characteristic of the ground water quality at Hatta in Damoh City, M.P., India was carried out during September to November 2012.

Two water samples from cement effluent industry and Eight Bore well water samples representing study area were collected and almost of all the samples values were within the permissible limit of World Health Organization (WHO) and Bureau of Indian Standards (BIS) prescribed for drinking water standards (pH 7.40 to 9.0, total dissolved solids (TDS) – 300 to 6000 mg/L, Electrical conductivity (EC) – 320 to 8000 micro mho /cm, phenolphthalein alkalinity (PA) range 20 to 120 mg/L, Total alkalinity (TA) 120 to 630 mg/L, Total hardness (TH) 110 to 920 mg/L, chloride 30 to 3275 mg/L, Ca – 25 to 109 mg/L, Mg 11 - 140 mg/L, Na 330 to 840 mg/L, K 18.4 to 30.1 mg /L, Iron 0.11 to 2.20 mg/L, free ammonia 0.45 – 0.57 mg/L, Nitrite 0.01 – 0.54 mg /L, Nitrate 1 – 10 mg /L, Sulphate 10- 230 mg /L, Fluoride 0.0 - 2.0 mg/L, Phosphate 0.02 to 0.10 mg /L, Tidy's test (as O mg/l) 0.4 – 68 mg /L, dissolved oxygen (DO) – 2.8 to 4.1 mg / L, biological oxygen demand (BOD) 80 to 224 mg / L, chemical oxygen demand (COD) 210 to 600 mg / L. However further it will need proper monitoring of the ground water quality in the study area. It is known that the groundwater quality is important as it is the main factor determining its suitability for drinking, domestic, agricultural and industrial purposes. In order to assess the groundwater quality, 16 ground water samples have been collected from different places in cultivated Pugalur and uncultivated Pugalur during January 2012. The water samples collected in the stations were analyzed for Electrical Conductivity (EC), pH, Total Dissolved Solids (TDS), Total Hardness (TH), Total Alkalinity (TA), majorcation like calcium, magnesium, sodium, potassium and anions like chloride, nitrate and sulphate in the laboratory using the standard methods given by the American Public Health Association (APHA, 2005).

Water quality indices are generally used as a tool to convert a large data set into a much reduced and informative form. Water quality index (WQI) by weighing arithmetic index method is used to assess the suitability for drinking and irrigation purpose. The results were evaluated in accordance with the drinking water quality standards suggested by the World Health Organization and are presented. Chloride, alkalinity, hardness, EC and potassium were found excess in most of the samples. The results are analyzed in the light of USSL diagram and Piper trilinear plot using quachem software. The Piper diagram showed that the groundwater was of mixed Ca-Mg-Cl type followed by Na-Cl and Ca-Cl type. Cement is one of the major industrial activities in Damoh Town, M.P., India. The waste water let out from this industry is a major environmental concern. Out of 10 units, 05 units are member in common effluent treatment plant (CETP). 02 CETPs are in operation. The remaining 04 units have provided individual effluent treatment plant (IETP). After treatment the effluent is let into sonar river a tributary of river Cauvery. The quality of effluent discharge from CETPs was monitored for a period one year. The report of analysis reveals that the total dissolved solids, chlorides, bio chemical oxygen demand, and chemical oxygen demand are exceeding the permissible inland surface water discharge standards. The discharge of partially treated effluent has adversely affected the river water quality as well as the groundwater quality. In order to protect the river and the groundwater, Madhya Pradesh Pollution Control Board (MPPCB) have directed all the cement units to provide Reverse Osmosis (RO) plant with Reject Management System (RMS) and recycle the entire treated effluent so as to achieve Zero Liquid Discharge (ZLD). The effluent samples from 2 different cement industries E(1), E(2) and E(3), were characterized for their pollution potential. The concentration of total dissolved solids (TDS) were found to be 2785, 3500 and 3210 mg/L for the industries1, 2 and 3 respectively.

The BOD's and COD's were 242.8 and 542.4 mg/L for E(1), 123.2 and 324.6 mg/L for E(2) and 356 and 738.4 mg/L for E(3). The pH of the effluents were 7.36, 7.8and 7.6 for E(1), E(2) and E(3) respectively. This implies that the effluents were not in acidic region. The nitrate, nitrite and phosphate concentrations were 21, 37 and 30 mg/L, 0.5, 0.8 and 0.8 mg/L and 25, 36 and 20 mg/L fir E(1), E(2) and E(3). The levels of copper (Cu), zinc (Zn), iron (Fe), manganese (Mn), lead (Pb) and chromium (Cr) were higher than the World Health Organization (WHO) standards for effluent discharge. This shows that the textile effluents have severe pollution potentials since the parameters measured have values above the tolerable limits compared to the world health organization (WHO) standards even if the industries promise their treatment. The results also showed that the ratio of COD:BOD were 1.87, 1.90 and 1.84 for E(1), E(2) and E(3) respectively, indicating that the effluents may not be able undergo up to 50 % sub state biodegradation, thus biological processes may not be feasible for the treatment of these effluents. The high values obtained for the parameters assessed, by those of the concentrations of the solid and of the oxygen demands, call for a pretreatment of the effluent before its discharge into water body.

Also, the high conductivity observed shows that sufficient ions are present in the effluents, thus suggesting that the chemical method of coagulation and flocculation may be an ideal treatment method. Effluents discharged by several industries, particularly the cement industry, have led to severe pollution of surface and groundwater sources and soils, which have ultimately affected the livelihood of the poor. Environmental problems in the agricultural sector caused by cement industrial pollution in Damoh district have been discussed in this study. Averting Expenditure Approach and Contingent Valuation technique have been employed for this purpose. The farm income and distance between farm and polluted river have been found significant in deciding the value of polluted lands. The pollution averting expenditure incurred by the farmers increases with increase in the intensity of pollution. It is mainly the farm income that determines the pollution averting expenditure. The farmers in the study area are well aware about the detrimental effects of pollution and they have expressed their willingness to pay for internalizing the pollution effects even though it is mainly the duty of the

polluter. Ground water analysis of 14 locations in Damoh was carried out during 2010 to 2011 to evaluate the physicochemical characteristics of water. Water sampling was made on four seasons In the Above mentioned year and analysis of water samples done by using standard methods. The result and thrust problem of high TDS results In this study shows that chloride concentration ranged from 35 to 1525 mg/L and sodium 20 to 800 mg/L .high sodium and chloride concentration makes the ground water unsuitable for drinking purpose. Permissible limit of chloride concentrations in excess of about 240 mg/L can give rise to detectable taste in water, but the threshold depends upon the associated cations. Consumers can however, become accustomed to concentrations of 240 mg/L. Until no major health based guide line value (Indian Standard) is proposed for chloride and sodium In drinking water but prolong consumption to be sensitive issue in the environment. The above critical studies on water pollution can force us the following conclusion to be strictly implemented

Conclusion

In order to find a solution for the above ground water pollution, MPPCB is now insisting all the cement units to provide Reverse Osmosis (RO) plant with complete reject management system and reuse the treated effluent for the process and ensure for Zero Liquid discharge (ZLD)

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REFERENCES

APHA, 2005; Standard methods for examination of water and wastewater American Public Health Association Washington D.C. New York.

Soni D.D. and Shrivastava, B.K. 1986; Fishes of Sagar District of Madhya Pradesh, *Bharti Journal.* Vol. 42, No.- 15(17) Part – II Sec. –B pp 59-68.

Thakur S.S. 1986; Seasonal variation of pH and alkalinity and their interrelationship in Sagar Lake. *Geobios,* nest, Report 5 pp 187-190. Science, Acad. Vol.-2.

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