



Physico-Chemical Analysis of Water and Locked Soil of Sadli Reservoir, Region Kasrawad, District Khargone M.P. INDIA

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Abstract

The physico-chemical properties of water and locked soil of sadli reservoir in kasrawad region were analyzed. The variation in the physico-chemical properties of locked soil and reservoir water were found in the present study. The physico-chemical characteristics of the reservoir water and locked soil samples were found to have great variation in the prescribed limit. Sadli reservoir, a small inland reservoir located in Village sadli, Teh Kasrawad District Khargone, Madhya Pradesh, India. It was built over Small river, in the basin of Narmada River. The physico-chemical characteristics, pollution studies of Sadli reservoir water and locked soil have been done in November, December 2012. The Study shows the contain sewage of different villages. Therefore the conservation and management of these water is very much required. Here we are study about chloride content, total hardness, Mg hardness, Ca hardness, alkalinity, temperature and Ph parameters. In locked soil we are study about Ph value, grain size, specific gravity, moisture content, elasticity and plasticity.

Keywords: Physico-chemical analysis, soil, village effluents, reservoir, alkalinity, hardness, chloride content.

Introduction

In India environmental pollution is one of the undesirable problem. The effects of industrialization, urbanization, population growth and unconscious attitude towards the environment are very serious. The industrialization and advancement in agriculture are necessary to meet the basic requirement of people, at the same time it is necessary to preserve the environment. The Village effluent and waste waters are loaded with pollutant, along with other pesticides, insecticides used during agriculture are also responsible for water and soil pollution¹.

Many people's have given adverse effects of different effluents on the growth of plants, sewage water has also been found toxic to several crop plants. The effects on seed germination and seedling growth of many crops have been generated by several workers in their experimental studies. Effect of water pollution on the aquatic organisms has recently become a interesting topic for investigation in the country. In previous years, the effects of water pollution on water bodies have been investigated in detail².

India is facing a serious problem of natural resource scarcity, especially that of water in view of population growth and economic development. Water is a prime natural resource, and a precious national asset, hence its use needs appropriate planning, development and management. The tropic status of a water body depends on the locality and its topography. Due to tremendous development of industry and agriculture, the water

ecosystem has become perceptibly altered in several respects in recent years. The increasing industrialization, urbanization and developmental activities, are major factor for water crisis. The health of lakes and their biological diversity are directly related to the human beings. In freshwater bodies, nutrients play a major role for growth of microorganism and other water bodies³.

Monitoring of water quality is the first step to management and conservation of aquatic ecosystems. It is also true that the management and conversation of water and locked soil by maintaining the physico-chemical quality of water and soil within acceptable levels⁴. Hence, in the present study, the physico-chemical parameters of Sadli reservoir water and locked soil to arrive certain conclusions on the structural and functional aspects of the reservoir and suggest ways and means for its conservation.

Material and Methods

The soil and water samples were collected from three different sites of sadli reservoir during Nov-Dec months of the year 2012. The collected samples of water and locked soil have been analyzed to determine their physico-chemical characteristics. The water and soil samples were collected in morning hours during November, December 2012. The temperature and pH parameters were recorded on the field. Samples were collected in cleaned acid washed plastic bottles and sterilized plastic bags and stored at 4°C. The soil samples have been analyzed for various parameters as pH, electrical conductivity (EC),

plasticity, elasticity, moisture content, specific gravity. These parameters of water and soil were done by standard methods⁵. Sadli, an inland reservoir with 100.07 ha water spread area, was built over a Small river in the basin of Narmada River. The reservoir is located approximately 10 km northwest of Kasrawad and approximately 40 km south of Khargone. This reservoir is a multipurpose tank used for different activities like drinking water supply, irrigation, fisheries etc. Three sampling station of reservoir showing, point 01, point 02, point 03 were selected. Form the selected point of water and locked soil samples was collected and analysis can be done by the different methods. The datas of these samples shown in table 1 and table 2.

Study Area: Sadli reservoir situated at the central part of Kasrawad tehsil, It is undergoing rapid urbanization and agriculture purpose. Sadli reservoir was completed in 1979 and having capacity of 1.30 m cum. It is spread in 100.07 hectares. (shown in figure 1 and figure 2).

Sampling Procedure and Laboratory Analysis: Water samples and locked soil samples were collected from all three sampling stations from November, December, 2012. Monthly samples of sub-surface water in triplicate were collected during

first week of each month in the early hours of the day (7 a.m. to 9 a.m.). Iodine treated double stop par polyethylene bottles were used for collection of water samples. Bottles were kept in ice bucket and brought to the laboratory for analysis. Some of the physico-chemical characteristics of water including water temperature, depth, color, transparency, pH were determined using mercury thermometer, graduated string, visual, Secchi disc, digital pH meter, respectively. Total alkalinity, total hardness, chlorides, calcium and magnesium Hardness, were analyzed using titrimetric method, The locked soil samples collected by three stations in sterilized plastic bags and store at 4^oC . By locked soil samples we have determine parameters as pH, electrical conductivity (EC), plasticity, elasticity, moisture content, specific gravity⁶.

Water Quality of the Reservoir: In Sadli reservoir, the water temperature increased during warmer months and decreased during colder months. Similar seasonal variations were also observed by Survey. Water level plays an important role in governing the water quality⁷.

Physico-chemical characteristics of water of Sadli reservoir is given in table-1 and the locked soil parameters is given in table-2.



Figure-1
Photo of sadli reservoir (water)

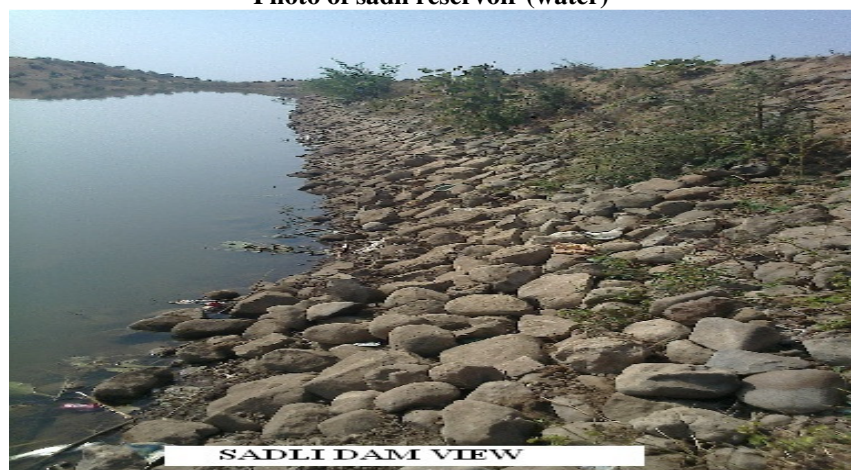


Figure-2
Photo of sadli reservoir (wall)

Table-1
Parameters of Sadli Reservoir water

Parameter	Point 01	Point 02	Point 03
Colour	Light yellow	Light yellow	yellow
Odour	Light sweet	Light sweet	Light sweet
Ph	6.89	6.95	6.82
Temprature	19	18	18
Total hardness	150	115	100
Ca hardness	28	28	34
Mg hardness	122	93	68
Alkalinity	125	95	105
Chloride content	35.5	31.5	28.5
Electrical conductivity	107.11 μ S/cm	235.40 μ S/cm	234.32 μ S/cm
Transparency	65.50cm	92.30cm	110.00cm

Hardness, chloride content and alkalinity parameters are in PPM

Table-2
Parameters of Sadli Reservoir locked soil

Parameter	Point 01	Point 02	Point 03
Colour	Black	Dark black	Carbon black
Ph	6.93	6.90	6.95
Temprature	18	17	17
Grain seize	Partly cohesive	Partly cohesive	Cohesive soil
Specific gravity	2.66	2.65	2.7
Moisture content	25%	29%	30%
Plastic limit	40%	28%	29%
Liquid limit	45%	30%	55%
Electrical conductivity	107.11 μ S/cm	235.40 μ S/cm	234.32 μ S/cm

Results and Discussion

The physico-chemical properties of locked soil and the water of sadli reservoir were analyzed in the present study. The physico-chemical characteristics of the water showed that pH values are 6.89 to 6.82. The physicochemical characteristics of the effluents differed substantially from one another with respect to chemical characteristics. The electrical conductivity (EC) from 107.11 to 235.4 mmhos/cm and temperature 17-19°C. A wide variation in the physico-chemical properties of soil and the water in sadli reservoir. Different samples of soils and water from the sadli area showed difference in the physico-chemical characteristics from one another with respect to chemical characteristics.

Reservoir: In Sadli reservoir, maximum water level was recorded in post-monsoon period while minimum water level was recorded in summer season. Water was turbid in monsoon season with yellow brown colour, while green colour in winter and transparent green color was observed in summer season. The transparency of water is mainly affected by factors such as biological productivity, suspended particles and water colour. The transparency in sadli reservoir ranged from 65.50 - 110.00 cm. Settlement of sand, silt and clay result in a higher transparency from the post-monsoon period reaching a maximum of 110.00 cm marks the highest transparency in this

reservoir. Conductivity measures the capacity of a substance or solution to conduct electrical current. The electrical conductivity was found to fluctuate between 107.11 μ S/cm and 235.40 μ S/cm in this reservoir and that falls within the range observed for Indian waters. According to this criteria, Sadli reservoir water falls under the category of mesotrophic water body.

Conclusion

Conservationists are meticulously attempting to conserve the biodiversity from anthropogenic erosion and 'pre natural' extinction. The major barriers in conservation of biodiversity for sustainable life in future include In adequate data base, inadequate funding for research, confusions and controversies over area selection for conservation⁸. This has made the task more and more difficult. On the basis of physicochemical characteristics it may be said that the Sadli reservoir is a mesotrophic water body, which is slightly inclined towards eutrophication. The tropic status of reservoir warrants a proper conservation and management and best possible use of the reservoir, the macrophytes will have to be controlled. This can be achieved by mechanical removal or by biological means using grass carp. Since the removal of nutrients in the form of biomass can only check eutrophication. The nallahs, streams and rivers let's joining the reservoir should be obstructed by constructing stop and check dams⁹. This will not allow the siltation in reservoir.

This soil study shows that considerable amount of soil and plant nutrients were lost through erosion in the northern upland areas of kasrawad sadli. The observed differences in soil loss permitted an assessment of the impact of soil erosion on some soil properties. This study also indicates that top soil loss due to accelerated erosion results in changes in soil properties. Changes in soil pH, elasticity, and plasticity and moisture contents were highly and positively correlated with cumulative soil loss. This study indicates the level of contamination at the waste and explores the relationship between ranges of quantitative variables¹⁰. Thus the open waste should be discouraged and a proper monitoring and remediation plan is needed to reduce the chances of ground water pollution by leaching of these contaminants. Some physical properties and good amount of organic matter in soils indicate that these soils have the potential to be used in compost after various experimental treatments¹¹. The study is useful in providing indicators of contamination at such dams and thus will be helpful in making any remediation plan for these contaminated soils.

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