INTERNATIONAL JOURNAL OF PHARMACEUTICAL, CHEMICAL AND BIOLOGICAL SCIENCES

Available online at www.ijpcbs.com

Research Article

THE ANALYSIS OF WATER AND LOCKED SOIL QUALITY USING PHYSICO-CHEMICAL PARAMETERTS IN SANGWI RESERVOIR OF DISTRICT KHARGONE, M.P., INDIA.

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ABSTRACT

The piece of investigation was carried out to study the water as well as locked soil of sangwi reservoir of khargone, M.P. India. The change in physico chemical parameters of water such as water temperature, ph, turbidity, transparency, total hardness, Ca hardness, Mg hardness, alkalinity, chloride content, electrical conductivity, colour were analyzed in a period of March-April 2013.As above the physico chemical parameters of locked soil such as ph, colour, temperature, grain seize, specific gravity, moisture content, elasticity and plasticity were analyzed in above period. Sangwi reservoir, a small inland reservoir located in Village Sangwi, Teh Kasrawad District Khargone, Madhya Pradesh, India. . The nutrients including are in sufficient quantities for the growth of aquatic animals in the reservoir. The above study indicated that the reservoir is under the category of mesotrophic water body slightly inclined towards eutrophication. Therefore, the conservation and management of this water body is very much required. The result indicated that physico chemical parameters of reservoir water and locked soil were within the permissible limits and can be used for domestic and irrigation purpose.

Keywords: Reservoir**,** Physico-chemical parameters, locked soil, moisture content, hardness.

INTRODUCTION

Much of the current concern with regards to environment quality is focused on water and soil because of its importance in maintaining the human health and health of the ecosystem. The quality of water and locked soil in any ecosystem provides valuable information about the available resources for supporting life in that ecosystem[1] The quality of water and locked soil depends as a large number of physico chemical parameters and analysis. The impact of water pollution and soil pollution on the human being has recently become a favourite subject for investigation in the world.

The industrialization and development 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 waste waters are loaded with pollutant, along with other chemicals used during agriculture are also responsible for water and soil pollution[2].

The aim of the study is to reveled out the pollution status of reservoir in terms of physico chemical characters of water and locked soil. The reservoir contain soil which covered by water called locked soil. In the water depth of approximate 3-4 feet

soil samples collected for investigation and analyzed. The pollution of lakes and reservoir and their biological diversity are directly related to the health of human beings[3].

The main aim of this work has to analyze various physico chemical parameters of water and locked soil of sangwi reservoir of kasarwad M.P. With the analysis of these parameters of water and locked soil shows the pollution status of water and soil of this region.

Due to tremendous development of industry and agriculture, the water ecosystem has become perceptibly altered in several respects in recent years and as such they are exposed to all local disturbances regardless of where they occur[4]. The increasing industrialization, urbanization and developmental activities, to cope up the population explosion have brought inevitable water crisis. The health of lakes and their biological diversity are directly related to health. In freshwater bodies, nutrients play a major role as their excesses lead to eutrophication. Excessive macrophytic vegetation is indicative of the eutrophication status of any water body[5].

Monitoring of water quality is the first step that can lead to management and conservation of aquatic ecosystems. It is also true that the management of any aquatic ecosystem is aimed to the conservation of its habitat by suitably maintaining the physico-chemical quality of water and soil within acceptable levels[6].

MATERIALS AND METHODS

The soil and water samples were collected from three different sites of sangwi reservoir during different months. The collected samples have been analyzed to determine their physico-chemical characteristics. The water and soil samples were collected in morning time during March 2013 and April 2013. Temperature and *p*H was recorded on the field. Water and soil 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 *p*H, electrical conductivity (EC), plasticity, elasticity, moisture content, specific gravity. Physicochemical parameters of water and soil were done by standard methods.

Sangwi, a small man-made reservoir with 100.07 ha water spread area, was built over a Small river. The reservoir is located approximately 10 km northwest of Kasrawad Tehsil in Madhya Pradesh, India and approximately 40 km south of Khargone this reservoir is a multipurpose point tank used for different activities like drinking water supply, irrigation, fisheries etc. Three sampling station **Map** of Sangwi reservoir showing sampling stations. Stations, namely, point 01, point 02, point 03 were selected for analysis of physico-chemical characteristics of water covering whole area of the reservoir (Figure 1and 2).

Sangwi reservoir located at the central part of Kasrawad tehsil, is undergoing rapid urbanization and agriculture purpose. Sangwi reservoir was completed in1979 and having capacity of 1.30 m cum. It is spread in 100.07 hectors. (Shown in figure 3).

SAMPLING PROCEDURE AND LABORATORY ANALYSIS

Water samples were collected from all three sampling stations from March April, 2013. 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, Sechi disc, digital pH meter, respectively, total alkalinity, total hardness, chlorides, calcium and magnesium Hardness, were analyzed using titrametric method at the sampling stations[7].

Fig. 1: Photo Sangwi Reservoir

Fig. 2: Photo Sangwi Reservoir

Table 1: Parameters of Sangwi Reservoir water

PARAMETER	POINT 01	POINT 02	POINT 03
Colour	Light yellow	Light yellow	Light yellow
Odour	Light sweet	Light sweet	Light sweet
Ph	9.52	7.5	7.5
Temprature	32	32	32
Total hardness	145	135	150
Ca hardness	28	26	26
Mg hardness	117	109	124
Alkalinity	65	65	90
Chloride content	35.5	28.4	56.8
Transparency	64.5cm	90.24cm	109.4cm
Co3- alkalimity	40	20	30
Hco3- alkalinity	25	45	60

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	Grey	Grey
Ph	6.90	6.92	6.98
Temprature	32	32	32
Grain seize	Cohesive	Partly Cohesive	Partly Cohesive
Specific gravity	2.60	2.65	2.50
Moisture content	29%	26%	26%
Plastic limit	42%	35%	36%
Liquid limit	45%	30%	35%
Electrical conductivity	107.11µS/cm	235.40µS/cm	234.32µS/cm

RESULTS AND DISCUSSION

The physico-chemical properties of soil of agricultural region and the water used for irrigation in sangwi area of kasrawad were analysed in the present study. The physico-chemical characteristics of the effluent water showed that water analysed in this study had *p*H 6.89-6.82. The physicochemical characteristics of the effluents differed substantially from one another with respect to chemical characteristics, as expected due to a relatively wide spectrum of effluent. The *p*H of the effluents ranged from 6.82 to 6.95 and 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 of agricultural region and the water in sadli area were found in the present study. 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, as expected due to a relatively wide spectrum of agriculture effluents sources and due to presence of chemical in the effluent[8]. (Shown in table 1 and table 2)

RESERVOIR

In Sangwi reservoir, maximum water level was recorded in post-monsoon period while minimum water level was recorded in summer season during both the years of study. Water was turbid in monsoon season with yellow brown colour, while green colour in winter and transparent green colour 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 with low value during monsoon season. 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 µS/cm and 235.40 µS/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. Clay, silt, organic matter, plankton and other microscopic organisms cause turbidity in natural waters. (Shown in Fig. 03)

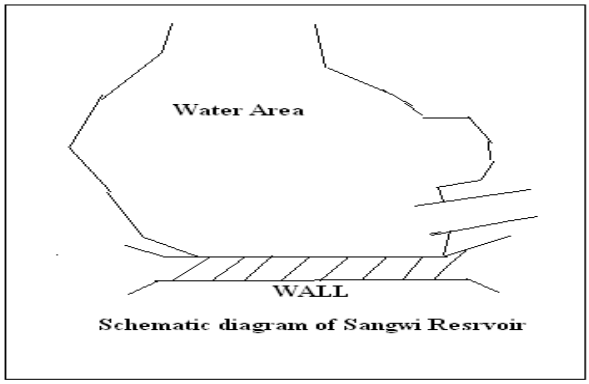

Fig. 3: Schematic diagram of Sangwi Resrvoir

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 quality. Range of variation and their annual mean along with standard deviation of various physico-chemical characteristics of water of Sangwi reservoir is given in Table1.

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 conservation. 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 trophic 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 lets joining the reservoir should be obstructed by constructing stop and check dams. 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 sangwi. 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, 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 variables. 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 treatments. 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.

ACKNOWLEDGEMENTS

The Authors are Thankful to the Principal, Jawaharlal Institute of Technology, Borawan for providing the necessary facilities.

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