"STUDY OF RE-ESTABLISHMENT OF NATURAL ECOSYSTEM AND REJUVENATION OF RAIPUR CITY LAKE, CHHATTISGARH (INDIA)"

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ABSTRACT

Pure water is important for human survival the provision of excellent quality water is an important feature for preventing diseases and up the standard of life. So, it's necessary to grasp regarding the various chemistry parameters of water like temperature, electrical physical phenomenon (EC), total suspended solids (TSS), total dissolved substance (TDS), turbidity, pH, alkalinity, hardness, chloride, sulphate, nitrate, fluoride, dissolved chemical element (DO), chemical element demand (COD), organic chemistry chemical element demand (BOD), nitrate and phosphate. Also, Biological parameters like planktons were examined. Results of the study indicated that the lake water of state is slightly contaminated.

For the present investigation following three ponds were chosen. 1. Mowa Pond 2. Maharaja Pond 3. Ramkund Pond

Keywords: earth science, chemistry characteristics, plankton.

1. INTRODUCTION: Raipur is that the capital town of Chhattisgarh state of central Bharat, recently shaped in November 2000. With a population of one million (GOI 2011), town sprawls across 188 km2 and consists of forty one villages. Historically, the economy of Raipur is predicated on agricultural process and sawmilling, serving as a regional hub for trade and commerce for a spread of native agricultural and forest product. Nowadays Raipur is a vital regional, industrial and industrial destination for coal, power, and steel and atomic number 13 industries. It's the biggest market of steel and iron in India of Asian country and among the richest cities of India. Raipur is found within the Centre of Chhattisgarh State and is delimited by East great circle 81°32'05" and 82°59'05" and by North Latitudes 19°46'35" and 21°53'00".

2. Mahanadi, Sonder, Pairi, Jonak, Kharun and Shivnath are the main rivers flowing within the Raipur district. Raipur is additionally endued with an oversized range of perennial water bodies with large population housing in its locality. town has witnessed a high rate in population, that has not matched with a corresponding enlargement in infrastructure.

1.1 Problem faced by urban lakes

1. Urbanization / industrialization
2. Dumping of debris and garbage
3. Industrial effluents
4. Continuous flow of untreated waste water
5. Eutrophication
6. Change of land use
7. Cattle washing
8. Tampering inflow and outflow channel
9. Pollution due to idol immersion
10. Encroachments

FIG 1.1*: Mowa Pond*

FIG1.2: *Maharaja Pond*

FIG1.3: *Ramkund Pond*

Table 1: *Municipal sources of wastewater (Water Quality control Handbook)*

Classification	Remarks	Average flow/ person/day	BOD_5 person/day
Municipality	Residential	380 l	0.10 kg
Subdivision	Residential	380 l	0.10 kg
Hospitals	Per bed	760 l	0.20 kg
Schools, high	With cafeteria & showers	100 l	0.03 kg
Factory or office	With showers/shift	130 l	0.03 kg
Motels	Per unit	380 l	0.06 kg
Ordinary restaurants (not 24 hours)	Per seat	130 l	0.10 kg
Curb service	Per car space	190 l	0.14 kg
Country clubs	Per member	190 l	0.10 kg

Water pollution causes serious adverse effects upon water bodies caused by human activities as illustrated in Figure 1.1. Human activities like exploitation of resources for industrial

production conjointly result in pollution. Constant has been delineate in Figure 1.2 The Figure shows that industrial activities like production of amphibole sheets, chemical factories, tanneries and oil refineries result in pollution.

Mining activities like crushing the rock, extracting coal and other minerals from the ground in the raw form contain harmful chemicals which can increase the number of toxic elements when mixed up with water. Mining activities emit several metal waste and sulphide from the rocks which contaminate the water as illustrated in Figure 1.2 The wastewater discharged from the mines depends on the kind of mines like metal ore mines, coal mines, sulphur mines, petroleum and natural gas and stone quarries and limestone mines. Effluents from these mines contain a large number of metal ions, sulphur acid, suspended solids which results in contamination of water.

Figure 1.3 Human activities leading towards water contamination

Table 2: *Agricultural impacts on water quality*

Agricultural activity	Impacts
	Surface water
Tillage/ploughing	Sediment/turbidity: sediments carry phosphorus and pesticides adsorbed to sediment particles; siltation of river beds and loss of habitat, spawning ground, etc.
Fertilizing	Runoff of nutrients, especially phosphorus, leading to eutrophication causing taste and odour in public water supply, excess algae growth leading to deoxygenation of water and fish kills.
Manure spreading	Carried out as a fertilizer activity; spreading on frozen ground results in high levels of contamination of receiving waters by pathogens, metals, phosphorus and nitrogen leading to eutrophication and potential contamination.

Feedlots/animal corrals	Contamination of surface water with many pathogens (bacteria, viruses, etc.) leading to chronic public health problems. Also contamination by metals contained in urine and faeces.
Irrigation	Runoff of salts leading to salinization of surface waters; runoff of fertilizers and pesticides to surface waters with ecological damage, bioaccumulation in edible fish species, etc. High levels of trace elements such as selenium can occur with serious ecological damage and potential human health impacts.
Clear cutting	Erosion of land, leading to high levels of turbidity in rivers, siltation of bottom habitat, etc. Disruption and change of hydrologic regime, often with loss of perennial streams; causes public health problems due to loss of potable water.
Silviculture	Broad range of effects: pesticide runoff and contamination of surface water and fish; erosion and sedimentation problems.
Aquaculture	Release of pesticides (e.g. TBT (Tributyltin)) and high levels of nutrients to surface water and groundwater through feed and faeces, leading to serious eutrophication.

The ranking of agriculture as a major polluter is highlighted by the statistics of Table 6.4. Fully 72% of assessed river length and 56% of assessed lakes are impacted by agriculture.

Table 3: *Percent of assessed river length and lake area impacted*

Source of pollution	Rivers (%)	Lakes (%)	Nature of pollutant	Rivers (%)	Lakes (%)
Agriculture	72	56	Siltation (sediment)	45	22
Municipal point sources	15	21	Nutrients	37	40
Urban runoff/storm sewers	11	24	Pathogens	27	

Resource extraction	11		Pesticides	26	
Industrial point sources	7		Organic enrichment DO	24	24
Silviculture	7		Metals	19	47
Hydrologic/habitat modification	7	23	Priority organic		20
On-site wastewater disposal		16			
Flow modification		13			

1.2 How to stop contamination

Water contamination will be stopped by the subsequent ways that (Figure one.6).

• Education: creating individuals attentive to the matter is that the commencement to resolution it.

Greater public awareness will build a positive distinction.

• **Laws:** Implementation of Strict Environmental laws can facilitate in dominant true.

• **Economics:** Introduction of pollution credits on the lines of carbon credits. Most environmental consultants agree that the simplest thanks to tackle pollution is thru one thing known as the defiler pays principle.

This implies that whoever causes pollution ought to ought to pay to wash it up, a way or another.

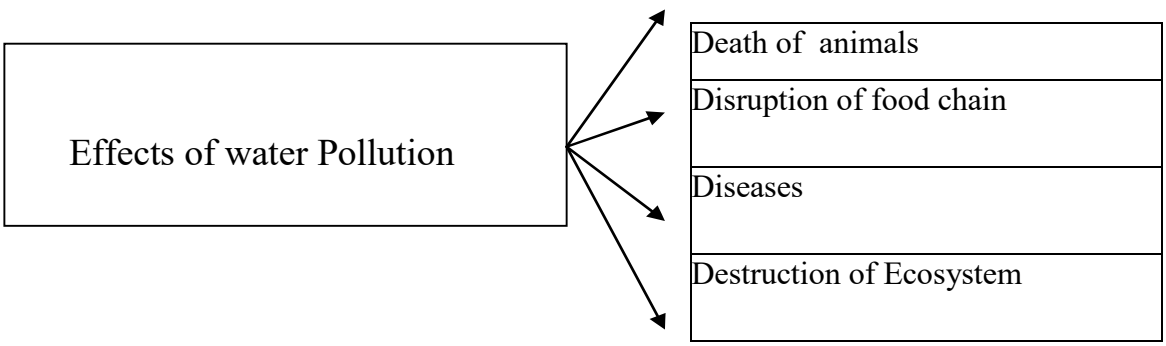

Figure 1.5 effects of water pollutants

Role of Phytoplanktons in aquatic ecology Studies on the seasonality of Indian fresh being were initiated by Sewell in 1934 (Kanagasabapathi & Rajan 2010).

2. LITERATURE REVIEW:

LITERATURE REVIEW LIMNOLOGICAL STUDY OF WATER many limnologists have worked on numerous chemistry and biological aspects of water bodies round the globe. The many works of eminent scientists and authors are reviewed and conferred. NATIONAL within the understanding of the ecology of fresh systems, analyses of chemistry parameters area unit terribly essential. The earth science of 3 fresh ponds, Contaminated and pure was studied by Munawar (1970) over 2 years. The ponds studied, differed well within the degree of organic pollution. Physico-chemical complexes occurring within the ponds were analysed that exhibit fascinating interrelationships. The investigation indicated sure necessary complexes in operation within the scheme.

3. RESEARCH METHODOLOGY Introduction This chapter provides an entire rationalization of the analysis style and also the procedures wont to acquire and analyze the strategy and knowledge. It covers the analysis technique used like web site survey, knowledge assortment strategies, sampling style and strategies of information analysis.

3.1 analysis style

We know that water is Associate in nursing absolute and essential necessity of life. It's conjointly a carrier of the many diseases thence this analysis is predicated on checking and testing the water quality. Firstly, all the foremost ponds of Raipur town were survey

3.2 Data Collection Methods

To survey this study, both primary data and secondary data were used so that an appropriate conclusion could be achieved. 3.2.1 Primary Data First-hand data obtained by researchers on the variables of interest for the specific purpose of the study is called primary data (Sekaran et al., 2010). Research Methodology 56 The data that was obtained by analysing the constituents of water samples from different water bodies under consideration was treated as the primary data for the research work. 3.2.2 Secondary Data The information that is obtained from sources other than the researchers who were conducting the current study is known as secondary data (Sekaran et al., 2010).

3.3 Sampling Site/Area

Chhattisgarh has only one perennial river Mahanadi flowing across the state. The climate of Chhattisgarh is tropical and predominantly hot. Moreover, Raipur is the hottest place in Chhattisgarh. With summer spanning from March to June the temperature ranges between 29ºC - 45ºC (±2ºC), it is hot and humid in the rainy season (July to October) and cool and dry in the winter season (November to February) with temperature between 10ºC - 27ºC (±2ºC). Other than the river, ponds are the major source of water and are geographically located in a widely spread expanse of the state. Raipur has many naturally existing water bodies, lakes and ponds that due to geographical depression and geological formation retain water and are inundated during the rainy season.

3.4 Sample Collection

Collection of Sample for Mycological study in the research design presented below, the three steps that have been used to determine fungal diversity present in water samples are depicted. These three steps are

1. Sampling and analysis

2. Media standardization

3. Seasonal variation Research Methodology

A. Sampling and analysis

B. Media standardization and isolation of Fungal Flora

C. Seasonal variation and ecological study of fungi.

4. RESULT AND DISCUSSION

Result and Discussion 3.2.2 penetration. From the observed values it can be noted that Mowa Pond water was moderately hard during summer and winter (value<120) while it was hard during the rainy season (value>180).

For Ramkund Pond, similar characteristics as of Mowa Pond were observed and during the rainy season, it was hard. Maharaj and Pond showed similar characteristics as Ramkund Pond. Continuous production and consumption of oxygen take place in water bodies; decomposition of dead decaying matter will require oxygen while plant photosynthesis will generate oxygen.

It was observed that Mowa Pond had 6.3 mg/L 8.3 mg/L, 9.4 mg/L of Dissolved Oxygen. DO levels vary with temperature, which was verified with values observed The minimum dissolved oxygen level in the pond was recorded in the summer season. Aspergillus fumigatus is capable of growing at 37oC and higher temperatures.

Aspergillus fumigatus feeds on metals, nitrogen and peptides, hence dirty water is the best place to breed in for these fungi. The colonies of Aspergillus fumigatus were found in high numbers in samples of water derived from every pond. The number of colonies was higher in the rainy season; this season usually is hot and humid in Raipur, ideal for this fungus. Likewise, another fungus, notorious for causing damage to commercial crops is Phoma exigua, it causes wet weather blight in cotton and needs to be treated with excessive inorganic pesticide and antifungal agents. Another genus, Phoma glomerata was found in water samples, the genus is a pathogen notorious for destroying wool. The fibre of cloth is also deteriorated by these fungi. Complains of detrimental effects on cloth have been reported by the locals using these pond water. Result and Discussion 125 Literature reveals that the species of genus Aspergillus are causative agents of respiratory, kidney and liver disorders, allergy and increased risk of invasive infections (Denning, 1998) while Penicillium has its implications in allergy, asthma and other respiratory problems (Schwab & Straus, 2004).

5. SUMMARY AND CONCLUSION

All living organisms on the earth need water for their survival and growth. Water has many special properties which make it suitable for life on earth. It is called a universal solvent because it dissolves more substances than any other liquid without any chemical change. Hence being an inert compound, it also transports various essential substances without any change in living cells. But the water quality of lakes, ponds and rivers is deteriorating mainly due to the rapid increase in human settlements near these places with improper sanitation and run-off pesticides and various fertilizers from cultivable land. If these water bodies are to be utilized to the fullest then the knowledge of the extent of pollution and the status of water becomes essential to preserve the valuable sources of water for the future generation. Good quality drinking water is essential for the wellbeing of all people. Limnology is defined as “The scientific study of physical, chemical, biological and meteorological conditions in the fresh waters”.

This work aimed to study the presence of fungi, phytoplankton as well as different physicochemical parameters in the samples of pond water which was collected from a few ponds of Raipur, Chhattisgarh. For the present investigation following three ponds were chosen. ***1. Mowa Pond 2. Maharaja and Pond 3. Ramkund Pond***

1. Mowa Lake a pair of. Maharaj and lake three.

2. Ramkund lake
3. These water bodies were hand-picked thanks to the presence of dense population in its neighborhood. These ponds act because the main supply of water system to the folks of that space. The ponds were showing signs of serious pollution through visible indicators. Since many folks rely upon these ponds for his or her day to day water needs, it absolutely was necessary to see the extent of pollution through scientific measures.

6. Research Objectives

This work aimed to check the presence of fungi, flora additionally as completely different chemistry parameters within the samples of pool water that was collected from a couple of ponds of Raipur, Chhattisgarh. The work was dispensed within the following manner:-

i. Survey of pool water.
ii. Isolation of water mycoflora from completely different ponds of the town.
iii. Associate in nursing ecological study of water mycoflora.
iv. Seasonal and monthly variation of the mycoflora.

7. Conclusion

In this chapter, we have a tendency to begin with the outline of fungi isolated from water samples and so analysed the results from chapter five. Next, we have a tendency to provided conclusions on the results of samples in our analysis and validate our analysis objective. Correlation is additionally mentioned during this chapter to permit our analysis to be sensible for policymakers and environmentalists. Lastly, recommendations are bestowed to produce improvement and scope for future study.

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