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EXPERIMENTAL STUDY ON CONTAMINATION OF SURFACE AND SUB-SURFACE WATER AT LAKES IN AND AROUND COIMBATORE CITY

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Abstract:
Surface and sub surface water are the essential components for survial of oganism. Surface water and sub surface quality contamination is one of the most important environmental issues in Tamil Nadu. Due to increase in the population and industrialization of Coimbatore and there is solid waste are generation. The effluent of these wastes is being disposed randomly on soils, river, lake and roadside without any treatment. It is also affected by industrial waste water, dumping household waste and other causes. In this study of Lakes the physicochemical parameters of surface water and sub surface were tested. The parameters for surface water including pH, Electrical Conductivity, Total Dissolved Solids, Total Hardness, Calcium, Magnesium, Chlorides, Sulphates, NO_2, NO_3, Carbonate, Bicarbonate, Sodium, Pottasium, Dissolved oxygen COD and BOD to determine the water quality of study area. The physico chemical parameters of soil including pH, Electrical Conductivity, Organic matter, Calcium, Magnesium, Phospurus, Nitrogen, Pottasium, Copper, Zinc, Iron and Manganese. Mostly all the physicochemical parameters were found above the prescribed limit as recommended by WHO (2011) and BIS (2010) drinking water quality. There may be suggested that conservation of fresh water lakes can be implemented and regular monitoring for management of good water quality needful for sustainable environment.

Key Words: Chemical Parameters & Water Quality

1. Introduction:

Water is one of the most important and abundant compounds of the ecosystem. All living organisms on the earth need water for their survival and growth. As of now only earth is the planet having about 70 % of water. But due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity it is highly polluted with different harmful contaminants. Therefore it is necessary that the quality of drinking water should be checked at regular time interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases. It is difficult to understand the biological phenomenon fully because the chemistry of water revels much about the metabolism of the ecosystem and explain the general hydro -biological relationship.

- ✓ To analyze Physico-chemical parameters such as (pH), (COD), (B.O.D.), Hardness, TDS, and EC, etc..,
- ✓ To asses Physical change in the area; Change detection of land Use/ Cover such as water body, agriculture and dry land.
- ✓ To asses environmental impact on Water, human, agriculture and social economic condition of area.
- ✓ To know the current situations of those lakes this mentioned.

2. Study Area:

Singanallur Lake: Singanallur Lake is a lake in Singanallur, Coimbatore. It is one of the 9 large lakes in the city. A railway track connecting Podanur and Irugur passes through this lake. Over 110 species of birds have been spotted in this lake. The setting may not seem perfect to host these bright and beautiful migratory birds. But the Singanallur tank, considered to be the most polluted in the region has grown to be a welcome abode for winged visitors. The tank was chosen by the city's civic body for providing entertainment like boating to Coimbatoreans. As hyacinths proved to be a spoilsport, it was reduced to a water body filled with sewage water that flows through the Sanganur canal. In spite of the murky surroundings, the winged visitors have been flocking the tank in numbers. Best Time to visit this place is from October to February; when thousands of winged visitors throng this tank.

Kuruchi Lake: Kuruchi Lake is a suburb of Coimbatore city in the indian state of Tamil Nadu. It was upgraded to a muncipality in 2004; it was recently merged with the Coimbatore Corporation. As of 2011, the town had apopulation of 123,667.

Ukkadam Lake: Ukkadam lake also called as Ukkadam priyakulam is a lake in Ukkadam, coimbatore, South India. It is spread over an area of 1.295 Sq.km (0.5sq.mi) and has an average depth of 5.82 m (19.1 ft). In 2010, the lake was taken over by coimbatore corporation on a 90-year lease from the Public Work Department of the Government of tamilnadu.

3. Result:

Table 1: Singanallur Lake

Parameters	Units	1999	2015	2017(s1)	2017(s2)	2017(s3)
PH		7.27	8.2	7.43	7.61	7.86
EC	Ms/cm	1.79	_	2.10	2.25	2.20
TDS	mg/l	1553	1995	1320	1479	1420
TH	mg/l	730	_	399	548	500
Ca	mg/l	484	192.6	77.6	108	97
Mg	mg/l	246	54.3	50	67.6	63
Cl	mg/l	470	506	280	308	306
Sulphates	mg/l	466	147	95.2	246.4	204.2

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Nitrogen	mg/l	_	0.1	8.8	6.5	7
Nitrate	mg/l	3.3	55	1	1.1	1
Carbonate	mg/l	_	_	40	48	60
Bicarbonate	mg/l	_	_	472	448	430
Na	mg/l	157	312.6	184	210	202
K	mg/l	20	25.6	14	16	15
DO	mg/l	_	4.8	0.6	0	1.5
COD	mg/l	154	313	52	95	64
BOD	mg/l	4	254	12	12	6

Table 2: Kuruchi Lake

Parameters	Units	1999	2017(s1)	2017(s2)	2017(s3)
PH		8.64	8.65	8.72	8.5
EC	Ms/cm	0.45	1.86	1.86	1.92
TDS	mg/l	290	1220	1210	1250
TH	mg/l	33.6	323	327	363
Ca	mg/l	24	34	39	45.3
Mg	mg/l	9.6	58	60	61
Cl	mg/l	90	466	460	468
Sulphates	mg/l	28	9	56.2	29.8
Nitrogen	mg/l	_	9	9.2	8.6
Nitrate	mg/l	14	1.6	1.2	1.4
Carbonate	mg/l	_	36	40	44
Bicarbonate	mg/l	_	166	176	182
Na	mg/l	70	310	300	312
K	mg/l	30	28	24	28
DO	mg/l	_	8.8	13.1	5.8
COD	mg/l	540	254	234	242
BOD	mg/l	206	24	32	29

Table 3: Kuruchi Lake

Parameters	Units	1999	2017(s1)	2017(s2)	2017(s3)
PH		7.4	8.38	8.59	8.82
EC	Ms/cm	9.7	3.05	3.15	6.45
TDS	mg/l	1056	2050	2050	4250
TH	mg/l	342	278	266	371
Ca	mg/l	215	24	19.4	16.2
Mg	mg/l	126	53	53	80.4
Cl	mg/l	313	616	616	1408
Sulphates	mg/l	258	91	137	596
Nitrogen	mg/l	_	16	14.2	21
Nitrate	mg/l	2.2	2.1	1.3	3.1
Carbonate	mg/l	_	104	80	128
Bicarbonate	mg/l	_	436	496	668
Na	mg/l	164	423	416	928
K	mg/l	26	40	36	65
DO	mg/l	_	6.6	5.5	8.7
COD	mg/l	673	143	321	369
BOD	mg/l	4.4	54	42	51

4. Conclusion and Discussion:

- ✓ In this study area lakes, the maximum value (680) of Bicarbonate occurred in Ukkadam (U3) lake and minimum value (180) of Kuruichi (K1) occurred in Kuruchi lake. When compared to other lakes Ukkadam having high Bicarbonates content.
- ✓ In this study, the maximum value (52) of Biological Oxygen Demand occurred in Ukkadam(U1) lake and minimum value (7) of Biological Oxygen Demand occurred in Singanallur(S3) lake. When compared to other lakes Ukkadam having high Biological Oxygen Demand content

- ✓ In that analysis, the maximum value (108) of Calcium occurred in Singanallur (2) lake and minimum value (18) of Calcium occurred in Ukkadam (3) lake. When compared to other lakes Singanallur having high Calcium content.
- ✓ Carbonate contents, the maximum value (126) of Carbonate occurred in Ukkadam (3) lake and minimum value (38) of Carbonate occurred in Kuruchi (1) lake. When compared to other lakes Ukkadam having high Carbonate content.
- ✓ In this study area lakes, the maximum value (1400) of Chlorides occurred in Ukkadam (3) lake and minimum value (240) of Chlorides occurred in Singanallur(1) lake. When compared to other lakes Ukkadam having high Chlorides content.
- ✓ The results of COD, the maximum value (370) of Chemical Oxygen Demand occurred in Ukkadam (3) lake and minimum value (50) of Chemical Oxygen Demand occurred in Singanallur (1) lake. When compared to other lakes Ukkadam having high Chemical Oxygen Demand content.
- ✓ In that results shows, the maximum value (13) of Dissolved Oxygen occurred in Kurichi (2) lake and minimum value (0) of Dissolved Oxygen occurred in Singanallur (2) lake. When compared to other lakes Kurichi having high Dissolved Oxygen content.
- ✓ It includes, the maximum value (6.4) of Electrical Conductivity occurred in Ukkadam (3) lake and minimum value (1.8) of Electrical Conductivity occurred in Kuruchi (1) lake. When compared to other lakes Ukkadam having high Electrical Conductivity content.
- ✓ In this study area lakes, the maximum value (80) of Magnesium occurred in Ukkadam (3) lake and minimum value (50) of Magnesium occurred in Singanallur (1) lake. When compared to other lakes Ukkadam having high Magnesium content.
- ✓ In this study area lakes, the maximum value (3.1) of Nitrate occurred in Ukkadam (3) lake and minimum value (1) of Nitrate occurred in Singanallur (1) lake. When compared to other lakes Ukkadam having high Nitrate content.
- ✓ The range analysis of Nitrite, the maximum value (21.1) of Nitrite occurred in Ukkadam (3) lake and minimum value (5.2) of Nitrite occurred in Singanallur (2) lake. When compared to other lakes Ukkadam having high Nitrite content.
- ✓ In this study area lakes, the maximum value (9.9) of Ph occurred in Ukkadam (3) lake and minimum value (3.8) of Ph occurred in Singanallur (2) lake. When compared to other lakes Ukkadam having high Ph content.
- ✓ In this study area lakes, the maximum value (60.5) of Potassium occurred in Ukkadam (3) lake and minimum value (10.2) of Potassium occurred in Singanallur (1) lake. When compared to other lakes Ukkadam having high Potassium content
- ✓ In this testing report, the maximum value (920) of Sodium occurred in Ukkadam (3) lake and minimum value (180) of Sodium occurred in Singanallur (3) lake. When compared to other lakes Ukkadam having high Sodium content
- ✓ In this study area lakes, the maximum value (600) of Sulphates occurred in Ukkadam (3) lake and minimum value (0) of Sulphates occurred in Kuruchi (1) lake. When compared to other lakes Ukkadam having high Sulphates content.
- ✓ In this study area lakes, the maximum value (4250) of Total Dissolved Solids occurred in Ukkadam (3) lake and minimum value (1100) of Total Dissolved Solids occurred in Kuruchi(1) lake. When compared to other lakes Ukkadam having high Total Dissolved Solids content.
- ✓ In this study area lakes, the maximum value (550) of Total Hardness occurred in Singanallur (2) lake and minimum value (270) of Total Hardness occurred in Ukkadam lake. When compared to other lakes Singanallur having high Total Hardness content.

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