

Sanitation of Killiriver

Silpa S Vijayan, Jinoj J, Sukanya I S, Sruthi S,
 B.Tech Students, KeralaUniversity, Trinity College TVM
 Civil Department

Asst. Prof. Mr. Adarsh M. S,
 HOD Civil Department Trinity College of Engineering,
 Kerala University

Abstract: -Waste disposal is the major problem faced by our current society. Contamination of river especially its downstream is mainly due to the authorized waste discharge from many sources including domestic, commercial, and public facilities. In this paper we evaluate the contamination of Killi river and how can be solve it. Chemical and naturals method used to find the contamination of water.

Keywords: *Natural methods*

1. INTRODUCTION

Killi river, also called Killiyar, the main tributary of Karamana river, originates near Theerthakanear Panavur in Nedumangadu. Unregulated development of tourism, discharge of raw sewage and domestic effluents and industrial pollution are playing havoc with water quality in the Killi river basin in Thiruvananthapuram. Ninety percent of the ground water samples collected from river basin was acidic and 53 percent bacteriologically contaminated. Due to industrial effluent heavy metals are present in water, to remove it we use some natural and chemical methods of purification. Solid waste including sanitary napkins, diapers, hotel and bakery waste and slaughter house waste are illegally entering into river causing havoc odour change. The Parvathiputhanar canal flows through the thickly populated areas namely Poonthura, Vallakadavu, Chackai and join Akkulan- Veli Lake. It may pollute due to heavy discharge of waste water from many sources including sewage, sullage, and garbage generated in the city. The sewage treatment plant provided by flats, hospitals, commercial establishment having bypass line and poses a potential threat, operation of such units needed strict monitoring. Proper collection, segregation, treatment and disposal of solid wastes are also equally urgent. And finally, we suggest a water purification system on the banks of contaminated places.

2. SAMPLE COLLECTED

Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids and gases from water. The samples points are: - Anad, Nedumangadu, Killipalam, Karamana, Parvathiputhanar, Punthura, Karakulam, Jayathi, Thalyil, Murathankuzhi.



Fig1. Waste water in Jagathi.



Fig 2. Waste water in Karakulam



Fig 3: Waste Water in Karamana



Fig 4: Waste water in Parvathiputhanar



Fig 5: Waste water in Maruthankuzhi



Fig 6: Waste water in Thaliyal



Fig 7: Waste water in Punthura

3. TESTS CARRIED OUT

By purification of water different tests are done. Here natural and chemicals methods are used to purify the contaminated water. The tests carried out are:

PH, Turbidity, Alkalinity, Hardness, Chloride, BOD, Total E-coli, Thermal conductivity.

Natural Methods: Moringa seed, Orange peel, Banana peel.

4. RESULTS

Table 1: Test results

Sl. No.	Sample points	PH	Mineral Acidity	Total Acidity	Co2 Acidity
1	Anad	5.8	930	1375	445
2	Nedum	5.6	570	1005	435
3	Killi	5.3	170	230	60
4	Karam	5.2	160	205	45
5	Parvat	5.4	325	1005	680
6	Punthu	5.1	180	240	60
7	Karaka	5.5	425	945	520
8	Jayathi	5.3	510	1280	770
9	Thalyil	3.9	120	155	35
10	Murut	5.8	525	1335	810

Sl. No.	Sample points	Turbidity	Chloride	Hardness	BOD
1	Anad	20	285.3	55	7.6
2	Nedum	15	483.8	70	10.2
3	Killi	9	1414.4	135	24
4	Karam	12	893.3	160	16
5	Parvat	38	421.8	525	22
6	Punthu	30	2307.7	445	18.5
7	Karaku	12	1116.6	170	14
8	Jayathi	10	1290.3	460	13.5
9	Thalyil	13	359.81	210	26
10	Murut	20	1414.4	125	28.5

pH: Is a good indicator whether water is hard or soft. The pH of water is lower than 7 are acidic and greater than 7 are basic. The normal range for pH in surface water systems is 6.5 to 8.5, and groundwater system is 6 to 8.5. As compared to our results pH of water is acidic in nature. Alkalinity is a measure of the capacity of the water to resist a change in pH that would tend to make the water more acidic.



Fig 8: pH meter

TOTAL ACIDITY: The volume of standard alkali required to titrate a specific volume of the sample to pH 8.3.

MINERAL ACIDITY: The volume of standard alkali required to titrate a specific volume of the water sample to pH is 3.7.

HARDNESS: The water is highly mineral content. Hard drinking water may have moderate health problems. Hardness of water ranges 300mg/l.



Fig 9: Hardness

5. COMPARISON OF RESULTS

Table 2: comparison of results

Experiments	Standard Results	Experiment Result
pH	6.5-8.5	High
Mineral Acidity	3.7	High
Total Acidity	8.3	High
Co ₂ Acidity	Mineral-total	High
Hardness	300mg/l	High
Turbidity	5NTU	High
Chloride	250mg/l	High
BOD	3-5ppm	High
Total E-coli	10 coliform/100ml	

CHLORIDE: Process of adding chloride to water to kill certain bacteria. It may prevent the spread of diseases such as cholera, dysentery, and typhoid. The permissible limit of chlorine content in water is 250mg/l.

TURBIDITY: Turbidity is caused by particles suspended or dissolved in water that scatter light making the water appear cloudy. Turbidity is measured in unit NTU. In normal drinking water the turbidity range is 5 NTU.



Fig 10: Turbidity meter

BOD: Amount of dissolved oxygen needed to aerobic biological organisms to break organic material present in water. The permissible limit of BOD content in water is 3-5ppm.



Fig 11: BOD incubator

TOTAL E-COLI: 95% of samples should not contain coli form in 100 ml 10 coli form/ 100ml.

By comparing the experimental results and standard results, experimental results are high. By comparing pH our results are in acidic nature. Turbidity is too high and it can't be used to drinking purposes. Parvathiputhanar may have high turbidity. And the chloride content is also high and it may cause health problems. Muruthakuzhi and Killipalam may have high chloride content. The BOD limit is between 3-5ppm but in our results it may too high. Hardness is high in Parvathiputhanar, and it may reduce by reduction of calcium and magnesium salts. Total E-coli may be calculated 95% of samples should not contain coli form in 100 ml 10 coli form/ 100ml. So as to compare these results we conclude that it can't be used for drinking, bathing, cooking, washing purposes.

6.SUGGESTIONS

In our project we suggested that, two methods are mainly used to purify these contaminated waters. One is purifying by using natural methods, by natural method we use Moringa seed, Orange peel and Banana peel. And our second suggestion to introduce a water purification system on the banks of most contaminated and populated areas.

7.NATURAL METHODS

By method of purification, in natural methods the experiments may done by using Orange peel and Banana peel.

7.1. Orange peel

The use of low cost and eco-friendly absorbents has been investigated as ideal alternatives to the current expensive method for removing dyes from waste water. Orange peel principally consists of cellulose, pectin, hemicelluloses, lignin, chlorophyll pigments and other molecular weight hydrocarbons. The effective parameters of pH, solid/liquid ratio, time and initial dye concentration were investigated.

A. Preparation of orange peel adsorbents.

Orange peel were selected and washed with several times to remove ash and other contaminants, followed by double distilled water washing. The washed peels were left at ambient temperature for 36 hrs, then crushed and sieved to small particles (3.35mm sieve).

7.2. Banana peel

Environmental pollution by toxic heavy metal has become a challenging problem to maintaining the quality and hygiene of water.

B. Adsorbent preparation

Banana peels were selected and washed with water several times to remove ash and other contaminants. After sometime banana peels was washed with distilled water until dust is removed. After sometime banana peels was dries in the oven at 80⁰c for 2 hrs. Then crushed and sieved through 2.2 mm sieve. Powder was collected and washed with distilled water after the sample was used for batch adsorption studies.

8. CONCLUSION

Unregulated development of tourism, discharge of raw sewage and domestic effluents and industrial pollution are playing havoc with water quality in the Killi river basin in Thiruvananthapuram. Analysis of water samples collected from 10 locations along the river basin. In this paper we evaluate the contamination of kill river. We concluded our project by introducing natural and chemical method of water purification and to a suggestion of water purification system.

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