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ANALYSIS AND REMOVAL OF PHOSPHATE FROM WASTEWATER BY USING RICE HUSK

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Abstract - *Water plays an important role in human development and are on important finite natural resource. the physio-chemical characteristics of water determined to examine the water quality. The study of water quality involves a description of occurrence of various contaminants in water use. The present study was undertaken to carry out a quality assessment and analysis of phosphate on behalf of wastewater of river Mutha. Parameters like BOD,COD,PH,DO are Tested It is found that concentration is higher than permissible limit and it is factor to blame eutrophication. Adsorption with Activated rice husk ash (ARAH) is one of the most effective and economical method for removal of phosphate. The study revealed that the optimum conditions for the removal of phosphate compounds were achieved with percentage of 70%-80% by activating rice husk with HCL.*

***KeyWords*:**
Phosphate,Eutrophication,Adsorption,BOD,COD,DO.

1.INTRODUCTION

India has witnessed a rapid increase in the urban population with that water demand also increasing rapidly but the insufficient wastewater treatment facilities resulting untreated sewage disposal into natural water bodies it produces negative effects on the health of both people and systems. Wastewater management is an intense need of today's world the statistic's shows that in India approximately 25 to 30 % of wastewater getting treated at satisfactory level. In rural areas people don't have access of drinking water due to lack of piped water supply. On the other hand urban areas are facing the problem of inadequate supply and low quality services. Approximately 80% of water turns to wastewater after its utilization.

The Mutha river is a river in western Maharashtra, India it arises in the western ghats and flows eastward until it merges with the Mula river in the city of Pune. It has been dammed twice, first at the Panshet dam (on ambi river), the water released here is dammed again at Khadakwasla .

In 2014, the govt of Maharashtra announced that the pune municipal corporation would build new sewage treatment plant to ensure that no sewage would be dump into river.

2. OBJECTIVES

1. To analyze the concentration of phosphate present in the Mutha river.
2. Observing the factors boosting phosphate concentration
3. To study the isotherms and theory of activated carbon
4. Removal of phosphate by using rice husk activated carbon.

3.METHODOLOGY

1. Selection of water collection points on the Mutha river in pune was done with the help of maps. River bank survey and with public interaction in month of September site were selected.
2. After surveying 20 different nodal points were selected on the Mutha river by help of measuring tape.

3. The wastewater samples were collected in plastic bottles after 9.00am from selected locatio
4. Various parameters were tested in the laboratory by using CPCB standards.
5. After testing collected samples in laboratory obtained results were tabulated suitably. This recorded results then analyzed for interpretation of results.
6. The obtained results are compared with WHO standards because no standards were set for phosphate by BIS.

Fig -1: Sample collection points and study area

For study and analysis purpose we select 20 points along river bank were selected as shown in fig 1 from Mutha river which is near of 'BABA BHIDE BRIDGE, DECCAN PUNE' connecting roads and other obstructions marked on site for further use. To gather information local public helped us out. Water collection points were selected approximately from 0 to 1000m on interval of 50m samples were taken from right left and of centre also. River discharge is very poor due to insufficient raining. Different types of wastes are present in Mutha river municipal solid waste, hazardous waste & biomedical waste.

EXPERIMENTAL WORK FOR PHOSPHATE DETERMINATION:-

After studying this aspect of mutha different sample at 50m were collected in 1lit plastic bottles in between 9.00am to 11am. D.O. is fixed on site then sample were brought to the laboratory for testing within 4 hours after collection. Samples were tested in the laboratory by using ammonium molybdate, stannous chloride and spectrophotometer.

TABLE -1: Chainage wise concentration of Phosphate along the river bank

CHAINAG-E IN METERS	CONCETRATION IN mg/lit		
	LEFT	CENTER	RIGHT
0	0.868	0.89	1.287
50	1.418	0.968	0.688
100	0.568	0.745	0.77
150	0.852	0.543	0.293
200	0.334	0.526	0.28
250	0.963	0.962	0.662
300	0.866	0.431	0.338
350	1.008	0.936	0.998
400	0.91	0.913	0.842
450	0.768	0.868	0.846
500	0.73	0.85	0.856
550	0.925	0.94	0.937
600	0.919	0.6	0.809
650	0.905	0.835	0.929
700	0.94	0.78	0.751
750	1.074	0.879	1.629
800	1.035	0.835	1.002
850	0.849	0.985	1.046
900	0.939	1.228	0.968
950	1.228	0.918	0.857
1000	1.337	0.829	0.934

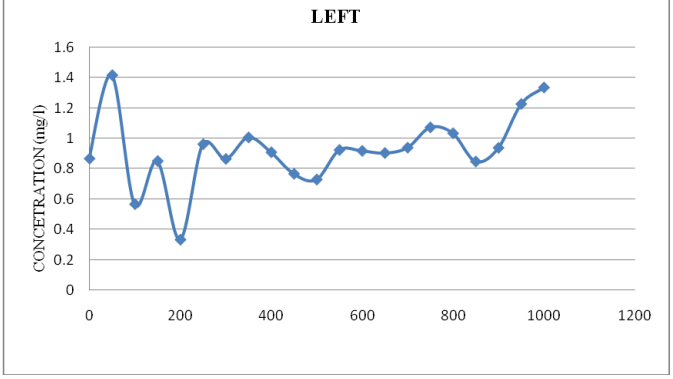


Chart -1: Left side of river bank

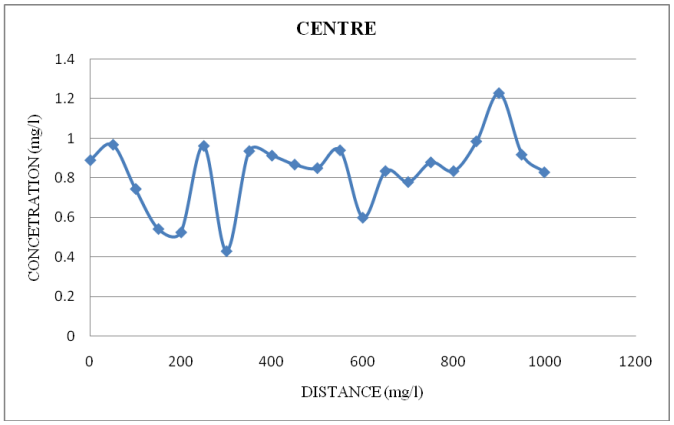


Chart-2: Centre of river bank

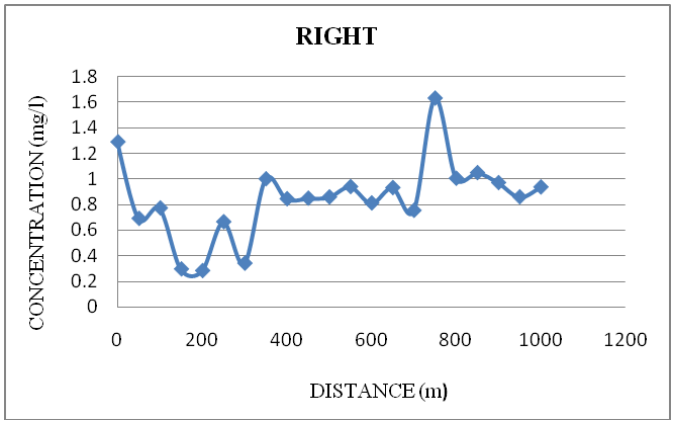


Chart-3: Right side of river bank

REMOVAL OF PHOSPHATE BY RICE HUSK METHOD

Agro residue rice husks are the outer covering of paddy & account for 20-25% of its weight. The annual generation of rice husk in India is in the range of 18-22 million rice husk is as agricultural waste obtained from rice mill during rice refining.

(A) (B)

Fig-2 (A): Natural rice husk.
Fig-2 (B): Natural rice husk after burning.

(A) (B)

Fig-3 (A): Natural filtration process for carbon content
Fig-3 (B): Incineration of rice husk

We use rice husk for experimenting purpose in the laboratory. Rice husk which was burnt in the oven at 500^0 C. Then it was mixed in the mixer for 120 seconds then blackish colour ash is form then it is washed by help of filter using filter paper and distilled water then it is dried at 500^0C for 2 hrs 100gm ash is mixed with HCL to activate it with the normality of 1:1. Then it is kept at room temperature for 24 hrs to dry it. Again it is washed by distilled water by filtration process and kept in oven at 110^0C & again it is dried. Activation of ash is completed. Then stock solution is prepared 4.39gm KH_2PO_4 & distilled water then it is dissolved.

Stock solution is taken 4.8ml & marked upto 3lits. 500ml sample is taken into 4 different beakers & 2gm of ash is added in each beaker and then dosage increased and results are recorded.

5.RESULTS AND DISCUSSION

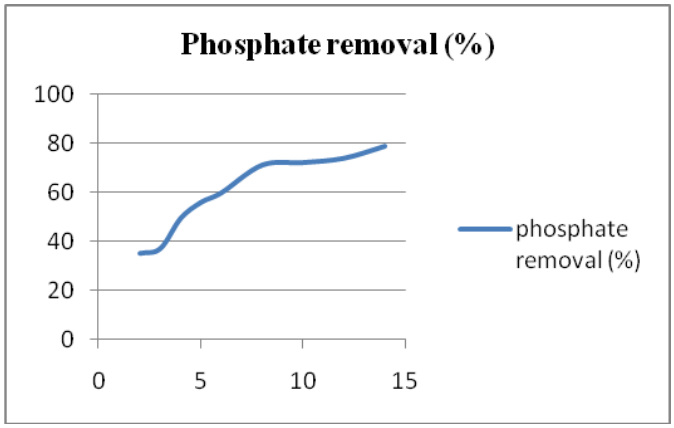
Following table shows the amount of dosage and percentage removal of phosphate,

Table-2: Percentage removal of phosphate

Sr. No.	Amount	Absorption	Concentration Removal efficiency= (Co-Ce/Co)*100	Removal
1	2g	0.507	1mg/l	35.06%
2	3g	0.488	0.97mg/l	37%
3	4g	0.419	0.78mg/l	49.35%
4	5g	0.382	0.68mg/l	55.84%
5	6g	0.356	0.62mg/l	59.74%
6	8g	0.288	0.44mg/l	71%

7	10g	0.283	0.428mg/l	72%
8	12g	0.274	0.404mg/l	73.63%
9	14g	0.246	0.3289mg/l	78.63%

Chart-4: Aadsorbent vs % phosphate removal



There Are Various Reasons For The Acceleration Of Phosphates In Mutha River.

- Phosphate Presence In River Water Due To Geological Condition Of The River Bed.
- Fertilizers And Pesticides Used In Farming,Cleaning Agents Used In Household,Etc
- Domestic Sewage In Water Bodies.

Mutha river is surrounded by residential area and also drainage and other wastewater from various sources are discharged in river .rainfall can cause varying amounts of phosphates to wash from farm soil into nearby waterways. Phosphate will stimulate the growth of plankton and aquatic plants which provide food for fish. This may cause an increase in fish population and improve the overall water quality. However, if an excess of phosphate enters the waterway, algae and aquatic plants will grow widely, choke up the waterway and use up large amounts of oxygen. This condition is known as eutrophication or over-fertilization of receiving waters. Rapid growth of aquatic vegetation eventually dies and as it decays it uses up oxygen. This process in turn causes the death of aquatic life because of the lowering of dissolved oxygen in the river. In that river people were bathing and washing clothes due to which detergent level increases and simultaneously phosphate increases. Maintaining the Integrity of the Specifications.

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