

# Use of Eco Enzymes in Domestic Waste Water Treatment

Javalkar Sayali D.<sup>1</sup>, Shinde Shruti C.<sup>2</sup>, Savalkar Shweta S.<sup>3</sup>, Pawar Sudarshan E.<sup>4</sup>, Dhamdhare Akash H.<sup>5</sup>, Patil Shrikant T.<sup>6</sup>  
Diploma Students<sup>1-5</sup>, Lecturer<sup>6</sup>

Civil Engineering Department, JSPM's J. S. Polytechnic, Pune, Maharashtra, India

**Abstract:- Eco enzymes which are also called as “garbage enzymes” are the fermented product of fresh Kitchen waste, Jaggery and water which is proved as multipurpose solution for different uses. This paper gives the effect of enzymes in domestic waste water treatment. Eco enzymes can reduce pollutants in wastewater. The pH of eco enzyme was found to be 3.8, BOD about 140 mg/lit. Eco enzymes are tested on domestic waste water after fermentation of 30, 60 and 90 days after fermentation. Eco enzymes can be useful in treatment of wastewater which helps in reducing harm to environment.**

**Keywords:- Eco Enzymes, Garbage Enzymes, Domestic Waste.**

## I. INTRODUCTION

Along with increase in population the problem of sewage disposal become increasingly critical in our country. Most of the rivers and other water sources carry polluted water. In the sense of future planning for sources of water this pollution must be stopped. Polluted water source are making bad impact on human health and Environment. Therefore preservation of water resources for future generation, it's our today's duty to solve this problem with effective development in disposal of waste water. The technology in wastewater treatment has been improved now a day. It is possible to treat sewage with high efficiency and economical. There are many areas in urban and rural sides where sewage treatment has not been practiced well.

Domestic wastewater which only includes of waste water from kitchen sinks, washrooms and bathrooms etc. which are less harmful for disposal. If they are treated initially, they can be used in various purposes such as gardening, washing vehicle. The main concern in domestic wastewater is removal of biological organic pollutants and nutrients. Municipal sewage generally contains 40 to 45% of domestic wastewater. Thus they can be reused by treating with Eco enzymes, which also reduces the load on sewage treatment plant. Domestic wastewater generally consists of fats, organic matter, suspended solids and micro-organisms. They also contain hair and lint, thus water can be filtered to remove hair and lint to avoid further problems in disposal and treatment. Eco enzymes are protein molecules that increases chemical reaction rate. They act as a biological catalyst. Eco enzymes exert advantageous features that make them effective as compared to conventional catalyst. These garbage enzymes

practically do not present disposal problem since they are called Eco enzymes. During fermentation Ozone is produced which can be reduce the amount of carbon dioxide in the atmosphere and this turn in reducing global warming. Also during production of enzymes O<sub>3</sub>, NO<sub>3</sub> and CO<sub>3</sub> are generated and this could help in purify and whiten the clouds in the sky. There are various features of Eco enzymes that they can be used as following ways:

- As a household cleaning liquid.
- To remove foul odor, molds and grime in the kitchen and toilet.
- As an antibacterial and antiviral agent.
- To drive away insects to clean carpet and remove ticks.
- For laundry washing and ironing for mopping floor.
- For cleaning of vehicles.

## II. AIM

Use of Eco-enzymes in domestic waste water treatment.

## III. OBJECTIVES

- Prepare eco enzyme from fruit peeled waste and vegetable waste.
- To apply prepared eco enzyme to domestic waste water sample.
- To analyze the optimum dosage of eco enzyme in domestic waste water treatment.

## IV. LIMITATIONS

- Fermentation process is depending upon the microorganism activity.
- Surrounding environment and tropical condition can affect eco enzymatic activities.
- Excessive sludge can be obtained after completion of fermentation process.
- Quantity of fruit or vegetable waste can affect the characteristics of eco enzymes.

## V. MATERIAL AND METHODS

### A. Eco Enzyme Solution Preparation

#### ➤ Material Needed

Jaggery or brown sugar, Fresh fruit and vegetable peels, Air tight plastic container, measuring cup.

➤ Procedure for Preparation of Eco-Enzyme

- In an airtight plastic container, measure and add 1 part Jaggery + 3 parts veggie/fruit peels + 10 parts water. Example by weight: Weight 100g Jaggery or brown sugar + 300 g of veggie/fruit peel + 1000g of water use any multiples thereof, maintaining the same ratio.

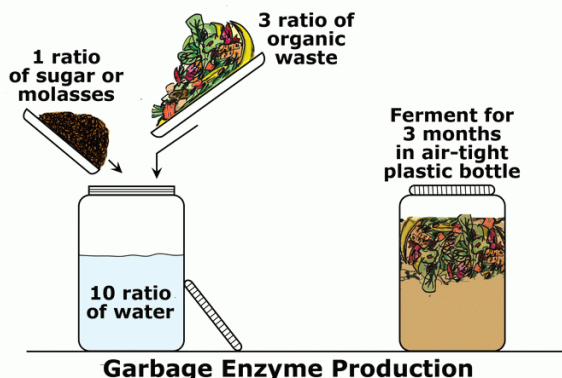


Fig 1:- Eco enzyme production

- Give the mixture a good shake, and screw on the lid tightly. The whole process takes less than 5 minutes to make once you're all set up with the ingredients and container, and the fermentation takes a minimum of 3 months, so it's best to stagger the enzyme making in batches with labels on the container indicating the date they are made. This will ensure a regular supply later on. After 3 months, you can filter the residue to get a clear, dark brown liquid that has a fresh, sour smell like vinegar.



Fig 2:- Eco enzyme container

B. Testing of Domestic Waste Water by using Eco Enzyme

In this study, 10%, 20% and 30% of Eco-enzyme Dosage with domestic wastewater were selected. Four beakers were filled with one liter domestic waste water sample and the respective dilutions of eco enzyme solution were added into these beakers respectively. These beakers were covered and were left for 5 days digestion period. The parameters like pH, TDS, BOD, COD, and MPN were analyzed daily for all the samples as per procedures in standard methods.

VI. RESULT AND DISCUSSION

A. Testing of Eco enzyme sample: The characteristics of filtered Eco enzyme sample were analyzed after 15 days of filtration. The biochemical parameter like pH, TDS, BOD, COD, MPN, protein, and carbohydrates were analyzed as per procedure in standard methods. Following are the characteristics of Eco enzyme.

Parameter	Unit	Value
pH	-	3.59
TDS	mg/l	1107
BOD	mg/l	88.6
COD	mg/l	178
MPN	CFU/100ML	<3

Table 1:- Characteristics of Tested Eco enzyme

B. Characteristics of Domestic Waste Water Samples: Domestic waste water used in this research was collected from outlet of a house in Hadapsar. The samples were collected in clean impermeable plastic container in the month of December. Analysis of sample was carried out. Following are the characteristics of domestic waste water;

Parameter	Unit	Value
pH	-	5.41
TDS	mg/l	495
BOD	mg/l	198
COD	mg/l	413
MPN	CFU/100ML	13x 10 <sup>4</sup>

Table 2:- Characteristics of Domestic Waste Water Sample

C. Characteristics of domestic waste water after 5 days:

Parameter	pH	TDS (mg/l)	BOD (mg/l)	COD (mg/l)	MPN CFU/100ML
Dosage					
10%	6.86	422	70.4	224	<3
20%	5.68	441	123	273	<3
30%	5.49	483	146	286	<3

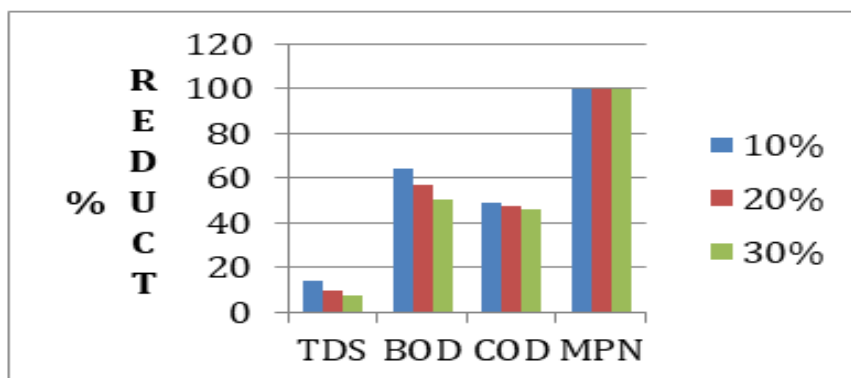
Table 3:- Characteristics of domestic waste water after 5 days

The pH values were increased from 4.16 to 6.82 after 5 days of digestion period.. The domestic waste water when treated with 10% eco enzyme solution showed percentage

reduction for TDS is 13.94%. It removes BOD 65.40 % and reduction in COD is found 48.66%. It can remove total coliform bacteria near to 99.9%.

The pH values were increased from 3.53 to 5.64 after 5 days of digestion period. The domestic waste water when treated with 20% eco enzyme solution showed percentage reduction for TDS is 9.29%. It removes BOD 56.56 % and reduction in COD is found 47.29%. It can remove total coliform bacteria near to 99.9%.

The pH values were increased from 3.21 to 5.36 after 5 days of digestion period. The domestic waste water when treated with 30% eco enzyme solution showed percentage reduction for TDS is 7.68%. It removes BOD 50.00 % and reduction in COD is found 46%. It can remove total coliform bacteria near to 99.9%.



Graph 1:- Percentage Reduction of various Parameters after treatment of domestic waste water with 10%, 20% and 30% Eco-enzyme Dilution

## VII. CONCLUSION

From the study, the eco enzyme produced was found to be acidic, and contained a large amount of organic material which resulted in high initial BOD. Eco enzyme is not efficient for removing TDS from the domestic waste water. As, the digestion days increased it can effectively remove coliform bacteria from the domestic waste water. The results indicate that 10% Eco enzyme solution may effectively remove BOD, COD and MPN from domestic waste water. Eco enzyme is cheap and cost effective. Hence they can be utilized as a low cost alternative tool for the domestic waste water. The Eco enzyme can be used in decentralized treatment aid in domestic waste water treatment for treating effluent and also maintaining neutral pH range of effluent in sewer.

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