

# Application of Eco-Enzyme for Domestic Waste Water Treatment

Ms. Samiksha Shridhar Kerkar, Lecturer, Department of Civil Engineering, SVCP, Pune, Maharashtra, India, Kerkarsamiksha25@gmail.com

Mr. Sahil Sanjeev Salvi, Assistant Professor Symbiosis Skills and Open University, Pune, Maharashtra, India, sahilsalavi123@gmail.com

**Abstract - Due to the rapid growth of urbanization and popularization the problem of organic solid waste management or garbage becomes extensive critical. As, this is the era of revolution and use of green technology. It is necessary to recycle and utilize product from the waste. Eco enzyme is a product produced with the use of raw material such as fruits peeled and vegetable waste, jiggery or brown sugar and water with the recipe and methods published in media. These study asses effects of Eco enzyme dilutions (5% and 10%) in the domestic waste water treatment. The effluent characteristics of treated domestic waste water sample met the irrigation standards after 5 days.**

**Keywords — Domestic waste water, Eco-enzyme, Fruit peeled, Garbage, Recycle, Vegetable waste.**

## I. INTRODUCTION

There are two years left for presidency focus of guaranteeing all Indians utilize toilets, yet in urban India alone, only 30% sewage is generated by numerous individuals which pours in treatment plant. The remainder is arbitrarily left in waterways, oceans, lakes and wells, dirtying 3/4th of the nation's water bodies, as indicated by different information sources. An expected 62,000 million liters for each day (MLD) sewage is produced in metropolitan zones, while the treatment limit crosswise over India is simply 23,277 MLD, or 37% of sewage created, as per information discharged by the administration in December 2015. Additionally describing of this information uncovers that of 816 metropolitan sewage treatment plants (STPs) recorded crosswise over India, 522 work. During this way, of 62,000 MLD, the recorded limit is 23,277 MLD however near 18,883 MLD of sewage is de facto treated. It means that 70% of sewage created in urban India isn't treated well while 79 STPs don't work, 145 are under development and 70 are proposed, as indicated by the Central Pollution Control Board's (CPCB) Inventorization Of Sewage Treatment Plants report.

India is a one of the populated nation and this is the main purpose behind huge waste being created frequently out of family and modern exercises like peeling and cutting of crude natural product squanders and vegetables squander utilized for preparing, eating and cooking. On the off chance that these natural waste or refuse when transparently dumped in open spots causes contamination or make hurtful consequences for soil, water, air and groundwater. Indeed, even today, huge part of solid waste is dumped on edges of towns or urban communities with no earlier treatment this

prompts groundwater tainting and increment in air contamination and increment in air contamination due to leachate permeation and increment in gases individually. Different examination uncovers that out of aggregate strong waste 80% can be used again either by reusing or reusing. For the most part in Indian urban areas the formal preparing and recuperation of units are not built up and the money related ramifications of recuperation and reusing has not been examined or considered to utilize strong waste for fund age. Enzymes have assumed a critical part in numerous parts of life since the beginning of time. Indeed they are fundamentally essential to the presence of life itself. Human advancements have utilized catalysts for a great many years without understanding what they were or how they function. In the course of the last a few ages, science has opened the riddle of compounds and has connected this learning to improve utilization of these astonishing substances in a consistently developing number of uses. Enzymes assume important parts in creating the nourishment we eat, the garments we wear, even in delivering fuel for our vehicles. Eco-enzyme is only vinegar or liquor got from maturing new kitchen waste, for example, veggie and organic product leftovers (peels, cuttings and bits), sugar (dark colored sugar, jiggery or molasses sugar) and water. The chemical is inferred after one channels and evacuates the buildup following 3 months. The key fixing is molasses, which the microscopic organisms and microorganisms introduce in the waste process into liquor. This is diminished in its last frame to acidic corrosive or vinegar. Vinegar with its acidic properties is notable as an inside and out non-harmful more clean.

## II. MATERIALS AND METHODS

### A. Collection and Preparation of Samples –

Fruits wastes such as Water melon, Orange, Nose berry and Pomegranates, and vegetable waste will collect from individual household for the preparation of Eco enzyme. And Domestic waste water sample is use for testing the efficiency of eco enzyme.

### B. Testing of Eco enzyme sample –

The characteristics of filtered Eco enzyme sample were analyzed after 15 days of filtration. A parameter such as pH, protein, carbohydrates, TDS, BOD, COD and MPN were analyzed as per procedure in ordinary methods.

### C. Testing of Eco enzyme sample

In the study, 5% and 10% of Eco enzyme of domestic waste water were selected. Four beakers were filled by the particular dilutions of eco enzyme selected solution. These beakers were concealed with aluminum foil and were left for process of digestion. The parameters like pH, TDS, BOD5, COD, and MPN were analyzed for all the selected samples as per procedures in ordinary methods.

## III. EXPERIMENTAL SETUP

### A. Preparation of Eco-Enzyme

For the preparation of Eco-enzyme we required three main materials that are easily obtained and cheap. The most material of the preparation was the food wastes like peeled fruit skin and vegetable waste, water and jiggery in keeping with research, forty-five percent of household waste is organic waste like fruit peels. Thus, this proved that the most material of the rubbish enzyme preparation was easily obtained daily. This scraps is then fermented in a bottle of 5 liter capacity for 3 months together with jiggery and water in ratio of 3:1:10(w/w). As an example, to arrange 1 liters of garbage enzyme: 300gm of food wastes, 100 gm. of brown sugars and 1 liters of water are required. The container used is totally air-tight; ensure the container cap is released a minimum of once on a daily basis day for a primary few weeks to let loose built-up gas of fermentation so as to avoid any explosion because of air mass exertion from the fermentation gas released.



Fig.1 Filled Container for Fermentation Process of 3 Months

After the three months completion of fermentation process filter the mixed sample and remove residue left over.

## III. RESULT DISCUSSION

The characteristics of filtered Eco enzyme sample were analyzed after 15 days of filtration. The parameter like pH, TDS, BOD, COD and MPN were analyzed as per procedure in ordinary methods. Within the study, 5% and 10% of Eco enzyme with domestic waste water was selected. Two beakers were filled by the particular dilutions of eco enzyme solution. These beakers were concealed with aluminum foil and were left for digestion. The parameters like pH, TDS, BOD5, COD, and MPN were analyzed for all the samples as per ordinary method.

TABLE I - THE PROPERTIES OF ECO ENZYME

PARAMETER	UNIT	VALUE
pH	-	3.59
TDS	mg/Lit	1107
BOD	mg/Lit	88.6
COD	mg/Lit	178
MPN	CFU/100 ML	<3

pH of eco enzyme solution is acidic in nature. When eco enzyme mix with domestic waste water sample, the pH increased to nearly neutral range.

TABLE II - THE CHARACTERISTICS OF DOMESTIC WASTE WATER SAMPLE

PARAMETER	UNIT	VALUE
pH	-	5.41
TDS	mg/Lit	495
BOD	mg/Lit	198
COD	mg/Lit	413
MPN	CFU/100ML	13X10 <sup>4</sup>

TABLE III - EFFLUENT PROPERTIES AFTER TREATMENT OF DOMESTIC WASTE WATER BY 5% ECO ENZYME SAMPLE

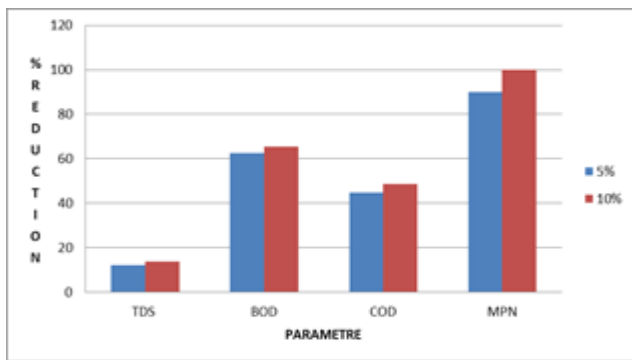
PARAMETER	1 Day	3 Days	5 Days	Irrigation Standards
pH	3.98	6.05	6.70	5.5-9
TDS	671	544	434	2100
BOD	196	118	74.2	100
COD	416	386	228	-
MPN	5.8X10 <sup>4</sup>	3.6X10 <sup>4</sup>	3.0X10 <sup>4</sup>	-

The pH values were increased from 3.98 to 6.70 after 5 days of digestion timeline. The TDS values were slowly reduced to 434 mg/Lit. The BOD values were decreased to 118 mg/Lit after 3<sup>rd</sup> day and 74.2 mg/Lit after 5th day. The COD values were reduced to 228 mg/Lit after 5th day. MPN values were 3.0 X 10<sup>4</sup> after 5 days of digestion timeline.

**TABLE IV EFFLUENT PROPERTIES AFTER TREATMENT OF DOMESTIC WASTE WATER BY 10% ECO ENZYME SAMPLE**

PARAMETER	1 Day	3 Days	5 Days	Irrigation Standards
pH	4.16	6.22	6.82	5.5-9
TDS	656	538	426	2100
BOD	184.6	104	68.5	100
COD	406	372	212	-
MPN	4.7X10 <sup>4</sup>	3.4X10 <sup>4</sup>	<3	-

The pH values were increased from 4.16 to 6.82 after 5 days of digestion timeline. The TDS values were gradually reduced to 426 mg/Lit. The BOD values were decreased to 104 mg/Lit after 3<sup>rd</sup> day and 68.5 mg/Lit after 5<sup>th</sup> day. The COD values were reduced to 228 mg/Lit after 5<sup>th</sup> day. MPN values were near to negligible after 5 days of digestion timeline.



**Fig.2 Percentage reduction of various parameters after treatment of domestic waste water with 5% and 10% Eco Enzyme solution after 5 days.**

The pH values were improved from 3.98 to 6.70 after 5 days of digestion timeline. The domestic waste water when treated with 5% eco enzyme solution showed percentage reduction for TDS is 12.32%. It removes BOD 62.51 % and reduction in COD is found 44.76%. It can remove total coliform bacteria near to 90%.

The pH values were improved from 4.16 to 6.82 after 5 days of digestion timeline. 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%.

#### IV. CONCLUSION

The percentage reduction of varied parameters of enzyme solution was higher after 15 days of filtration. The enzyme activity of Eco enzyme was enhanced with time. The digestion days may be reduced by increasing the time of fermentation period. The effluent characteristics met the irrigation standards after 5 days. The treatment of domestic waste water using enzymes is economical only when the time of digestion is a smaller amount. Further studies are required to scale back the digestion days in order that enzymes may be used effectively Eco enzyme may be a product produced with the use of stuff like fruits peeled and

vegetable waste, jiggery or sugar and water with the recipe and methods published in media. Production of Eco enzyme is double advantageous that it can reduce load on organic solid waste management and even have the various applications in agriculture, livestock farming, domestic cleaning etc. However, before full potential of Eco enzyme may be known. Some major issues remain to be addressed like characterization of Eco enzyme, Assessment of their impact on the environment, identification of methods of disposal of solid residue left after the filtration of sample.

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