

ASSESSMENT OF GARBAGE ENZYME'S EFFICIENCY FOR WASTE WATER TREATMENT

Deepak verma¹, Dr.Anoop Narain Singh², Prof. A.K. Shukla³

¹M.Tech. Department of Civil Engineering, Institute of Engineering and Technology, Lucknow

²Dept of Civil Engineering, Rajkiya Engineering College, Azamgarh

³Dept of Civil Engineering, Institute of Engineering and Technology, Lucknow

ABSTRACT

Garbage enzyme is made by fermenting orange and vegetable pee.

This fermentation creates natural chains of proteins, mineral salts and enzymes. This solution has the capacity to breakdown, change, create and catalyse-functions that make it a wonderful cleaning aid .Use of garbage enzyme is an effective method of treatment of wastewater.

To investigate the effectiveness of garbage enzyme application as an alternative method in sewage treatment by measuring TS, TSS , TDS, phosphorus, ammonia and BOD before and after application of enzyme.

Garbage enzyme is produced by brownsugar,fruit wastes and water in ratio of 1:3:10.From the test results for pure garbage enzyme, it is concluded that it is acidic, and does not contain ammonia nitrogen, phosphorus.

This paper analyzes the utilization of garbage enzyme as an alternative method for wastewater treatment or aid to the conventional STP method. The % reduction in TS, TSS and TDS in wastewater sample is noted after treatment with different proportion of garbage enzyme. Garbage enzyme is mixed with wastewater in different proportion (i.e. 0%, 5%, 10% ,20 % and 25%) and after 5 days % reduction in TS is found as 5.13, 82, 89 & 85 respectively. With the same proportions and days % reduction in TSS is 83, 94, 90, 92 and % reduction in TDS is 4.9, 80,89,87. Result shows that garbage enzyme accelerates the digestion process of organic content. Further the experiments need to be done to analyze the effect of garbage enzyme on BOD. Also experiments required for the optimum proportion of enzyme to be mixed with wastewater to get desired results.

Garbage enzyme is a value added bio-product which is made by decomposable waste. This paper analyzes the utilization of garbage enzyme as an alternative method for wastewater treatment or aid to the conventional STP method. The % reduction in TS, TSS and TDS in wastewater sample is noted after treatment with different proportion of garbage enzyme. Garbage enzyme is mixed with wastewater in different proportion (i.e. 0%, 5%, 10%,20 %and 25%) and after 5 days % reduction in TS is found as 5.13, 82, 89 & 85 respectively. With the same proportions and days % reduction in TSS is 83, 94, 90, 92 and % reduction in TDS is 4.9, 80,89,87. Result shows that garbage enzyme accelerates the digestion process of



organic content. Further the experiments need to be done to analyze the effect of garbage enzyme on BOD. Also experiments required for the optimum proportion of enzyme to be mixed with wastewater to get desired results.

Keywords- *Wastewater treatment, garbage enzyme, TDS, TS, BOD, Ammonia and Phosphorus.*

INTRODOCTION

Domestic sewage is one of the major point source pollution specially in Indian society. The waste water from households are directly discharged in to rivers or any natural streams which pollutes the river and the natural streams. According to a survey in India there is not sufficient WTP(Waste water treatment plant) as per requirement. So the use of garbage is an alternative solution for treatment of waste water. Garbage enzyme are protein molecule which catalyse the chemical reaction which are taking place in waste water. Garbage enzyme used for treatment of waste water is a very eco-friendly and sustainable way treatment of waste water because organic wastes are used in the making of garbage enzyme which catalyse the rate of chemical reaction in waste water. So organic wastes which disposed in open area causes nuisance to the environment are used in making the garbage enzyme to treat the waste water. Garbage enzyme solution was developed by Dr. Rosukon from Thailand. She has been actively involved in enzyme research for more than 30 years and encourages people to make garbage enzyme at home to ease global warming. It is a mind boggling natural substance of protein chains and mineral salts and adolescent hormones. The elements of Garbage is to determine (break down), (change), and catalyze the responses. The treatment of waste water with trash chemical is in minimal effort when contrasted with the traditional waste water treatment since natural squanders are accessible in bounty and molasses or dark colored sugar are effectively accessible in ease. The main disservices of trash chemical is that its takes approx. a quarter of a year for getting ready.

The treatment of waste water with garbage enzyme is in very low cost as compared to the conventional waste water treatment because organic wastes are available in plenty and molasses or brown sugar are easily available in low cost. The only disadvantages of garbage enzyme is that its takes approx. three months for preparing. Due to increase of population the management of organic wastes from households are critical. The effective treatment of municipal waste water occurs only in urban areas while in rural or village area there is not sufficient sanitation and treatment of waste water available so for these areas the treatment of waste water from the garbage enzyme will be very economical. Seventy to eighty percent of Indian river are getting pollution due to discharge of waste water. That's why treatment of waste water with garbage enzyme is very eco-friendly for rivers as well for environment.

Enzymes are protein molecules that catalyse chemical reaction. They act as biological catalysts and catalyze only specific molecules (substrates). Enzymes are selective for substrates and catalyze only one or a small number of chemical reactions among many possibilities. Anyway they are physiologically significant on the grounds that they accelerate,

by in any event 1000-overlay, the rates of responses by diminishing the measure of vitality required to frame a complex of reactant, known as the progress state complex, that is skillful to deliver response item.

Trash Enzyme (GE) is a natural arrangement created by the basic maturation of crisp vegetable waste, darker sugar and water, in much a similar procedure that wine is made. This aging makes a vinegar-like fluid with regular proteins, mineral salts and catalysts that make it grandly multipurpose all through the home.

MATERIALS AND METHODS

Orange strips and water were combined in the proportion of 1:3:10 to plan Garbage Enzyme. The blending procedure was done in a sealed shut plastic holder which had the option to extend. During the main month, gases were discharged during aging procedure. Weight developed in the holder was discharged day by day to abstain from cracking. Orange strips were pushed descending from time to time. The compartment was set in a cool, dry and very much ventilated spot. It was left to mature for 3 months to deliver catalyst. The aging yielded a tanish fluid, which was isolated from the solids. The arrangement was separated following 3 months to get chemical arrangement. A white shape arrangement was seen on the top surface of the arrangement. These might be B complex Yeast and nutrient C Yeast. The acquired compound arrangement was of light earthy yellow hued. It was then moved to a plastic jug. Compounds will never lapse. The more you keep, the more grounded it progresses toward becoming. The intensity of the chemical will be upgraded when water is added to it. Trash Enzyme is just for outside use. It ought not be put away in an icebox. The qualities of unadulterated Garbage Enzyme arrangement were examined in Bio-tech park following filtration of the compound arrangement (following 3 months of aging period). Clump test was completed to decide the impact of 5%, 10%, 20% and 25% trash chemical arrangement in treating waste water.

RESULTS AND DISCUSSION

The characteristics of pure garbage enzyme solution after 3 months of fermentation period (immediately after filtration of the enzyme solution), 30 days after filtration and 60 days after filtration are shown in Table 1

Table 1

PARAMETER	After immediate filtration	After 30 days of filtration	After 60 days of filtration
pH	2.91	3.01	3.8
TDS	2215	1485	1121
BOD	1300	560	92.6
Ammonia	BDL*	BDL*	BDL*
phosphorus	BDL*	BDL*	BDL*

*Below detectable limit

Garbage enzyme is mixed with wastewater in different proportion (i.e. 0%, 5%, 10%, 20 % and 25%) and after 5 days % reduction in TS is found as 5.13, 82, 89 & 85 respectively. With the same proportions and days % reduction in TSS is 83, 94, 90, 92 and % reduction in TDS is 4.9, 80, 89, 87. Result shows that garbage enzyme accelerates the digestion process of organic content.

The characteristics of pure waste water is given below in table 2

Table 2

Parameters	Unit	value
pH	-	6.10
TDS	mg/lit	563
BOD	mg/lit	190
Ammonia	mg/lit	9.5
phosphorus	mg/lit	112

Effluent characteristics after 27days of digestion periods

Table 3

Parameters	5%	10%	20%	25%	Irrigation standards
pH	6.8	6.5	6.3	5.7	5.5-9.0
TDS (mg/lit)	255	233	409	530	2100
BOD (mg/lit)	74	67	90	95	100
Ammonia(mg/lit)	0	0	0	0	-
Phosphorus(mg/lit)	0	0	0	0	-

Percentage reduction of various parameters

Table 4

Parameters	5%	10%	20%	25%
pH	-	-	-	-
TDS (mg/lit)	54.54	58.79	27.18	5.50
BOD (mg/lit)	61.45	65.43	54.50	49.50
Ammonia(mg/lit)	100	100	100	100
Phosphorus(mg/lit)	100	100	100	100

CONCLUSIONS

From the study, it was found out that garbage enzyme solution was not suitable for treating waste water immediately after filtration of the enzyme solution. The enzyme characteristics were varying with time. The enzyme solution than other concentrations. The treatment time also reduced to 5 days.

The variation of enzyme characteristics with time should be monitored. Treatment of wastewater using garbage enzyme solution is found to be effective only after reduction of BOD values of the enzyme solution. Further studies are required to investigate suitable additives or activators on enzyme action. Studies on pre-treatment methods prior to enzyme action need to be explored for reduction of high initial BOD and COD. More importantly, characterization of the garbage enzyme to reveal its constituents is a critical step for any future studies.

REFERENCES

C. Arun, P. Sivashanmugam, "Investigation of biocatalytic potential of garbage enzyme and its influence on stabilization of industrial waste activated sludge American Public Health Association (APHA), 2005. Standard Methods for Examination of Water and Waste Water, 21st ed. APHA, Washington, DC.

- Fu E. Tang, and Chung W. Tong, "A Study of the Garbage Enzyme's Effects in Domestic Wastewater" World Academy of Science, Engineering and Technology International Journal of Environmental, Chemical, Ecological, Geological and Geophysical Engineering Vol:5, No:12, 2011
- Arun, C. and Sivashanmugam, P., 2015. Investigation of biocatalytic potential of garbage enzyme and its influence on stabilization of industrial waste activated sludge. *Process Safety and Environmental Protection*, 94, pp.471-478.

- Tang, F.E. and Tong, C.W., 2011. A study of the garbage enzyme's effects in domestic wastewater. *World Academy of Science, Engineering and Technology*, 60, pp.1143-1148.
- Nazim, F. and Meera, V., 2013. Treatment of synthetic greywater using 5% and 10% garbage enzyme solution. *Bonfring International Journal of Industrial Engineering and Management Science*, 3(4), pp.111-117.
- Arun, C. and Sivashanmugam, P., 2015. Identification and optimization of parameters for the semi-continuous production of garbage enzyme from pre-consumer organic waste by green RP-HPLC method. *Waste management*, 44, pp.28-33