

GANGA WATER TREATMENT USING ORGANIC ENZYME

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Abstract Water pollution is major global problem of today's world which has harmful impacts on human and water bodies directly and it also affects the environment as well. Major source of this pollution is untreated sewage. Ganges is one of the holy rivers which has historically been associated with religious sentiments and holy beliefs. It is one of the largest river bodies of the world which serves water to more than 40% of India's population for their livelihood. However, its significance, quality and usefulness are threatened by human waste and industrial contaminant which is harmful for both environment as well as human health. Pollution in Ganges is identified as increase in various human activities (direct disposal of harmful industrial waste and dumping other waste products). Many initiatives have been taken by governmental and non-governmental actions to clean the river but have not been successful in delivering the desired results.

Organic enzyme is made up of organic substances which are easily available at every home. Organic enzyme is one of the best solutions for the treatment of raw water before dumping it into the rivers so that it may not have harmful impacts. It improves the major water quality parameters as it help to increase the amount of dissolved oxygen in water and decrease the amount of BOD (Bio-chemical oxygen demand) in river water and also improves various parameters of water including water quality like (pH, turbidity, alkalinity, hardness etc).

Keywords: Organic Enzyme, BOD, Dissolved Oxygen, Pollution.

I. INTRODUCTION

Water pollution can be observed in water bodies like rivers, lakes, oceans, aquifers etc. Rivers serve the whole population of the world and are counted upon by humans for their livelihood but ironically the existence is threatened by humans only. It is necessary to clean the water bodies as pollution in rivers is increasing day by day, which directly or indirectly affects the human, animals and environment. Some major source of pollution include various human activities like direct disposal of industrial wastes (including harmful chemicals) into the river without any treatment, dumping of waste disposal, washing clothes, bathing and many more. Without knowing any harmful effects of all these contaminant's people's direct disposed their wastes into the river. Water pollution may causes many harmful water-borne diseases like malaria, diarrhoea, cholera and many more.

Ganga is the largest river in India which embodies many holy beliefs and religious sentiments. At the same time it is also considered as one of the most polluted rivers in the world. Its significance, quality and usefulness are threatened by human waste and industrial contaminants which is now harmful for both environment as well as human health. Many governmental and non-governmental organisations run specific projects for cleaning the river. This opens the door for various other possible alternatives which can be counted up onto reduced the effect of pollution Ganga. The effects of the harmful metals in Ganga river are hazardous for the human health. The water of Ganga river is not good for drinking as it contains many harmful bacteria's in it which affect the human health. It is very important to save such holy river, which fulfills the human demand of water in different regions of Delhi, Uttar Pradesh, Bihar, Uttarakhand and many more.

Organic Enzyme

Organic enzyme is defined as the enzyme made by the organic products (jaggery/molasses, vegetable and fruits peels, and water) in a fixed proportion of 1:3:10. The required material is easily available in every kitchen. Organic enzyme has multiple benefits. It is one of the best treatments for polluted water. It increases the amount of Dissolved Oxygen in the polluted water and is also helpful in decreasing the BOD level. It also improves various other parameters of raw water. It provides many other benefits such as in domestic purposes, agriculture, aquaculture etc.

To reduce the effect of heavy metals in the ganga river I, personally make an enzyme named as organic enzyme and did some tests in the ganga water at two different location. Not only the effect of heavy metals but also the physical and biological properties of water develop good changes in it and gives the desired result. Therefore I can say that the enzymes are the best and the cheapest solution for tackling river pollution.

Applications of organic enzymes

Application of Organic Enzymes are:

- It increases the amount of dissolved oxygen in raw water and also decreases the BOD amount in water.
- It helps to reduce the effects of harmful heavy metals in the water.
- It increases the fertility of soil which help in increasing the crop growing rate.
- It also increases the aquaculture growth.
- It helps to maintain the water quality parameters for usage.
- It reduces the foul smell from the raw water.
- It can be used as household cleaning, car cleaning, washroom cleaning.

II. Objective

- To check the improvement in water quality parameter by using organic enzyme.
- To provide the best solution for increasing rate of water pollution at low cost.
- To provide an eco-friendly solution to combat the water pollution.

III. Methodology

To ready the organic enzyme, fermentation process is to be used. It includes the fresh kitchen waste (including vegetable peels and fruits dregs), molasses/jaggery and water in a fixed proportion.

The ingredients used to prepare organic enzymes in this research are fruits dregs(orange dregs, neem leaves), jiggery and water. These ingredients were mixed in a mixed proportion of 1:3:10. The process of mixing is done in a air-tight container which has property to expand.

During the first month, gases are release during the fermentation process. Pressure built up in the container is released in a 10 days interval to avoid rupturing. Fruits/vegetable dregs are push downward every once in a while. The container is kept in a cool, dry and well ventilated place. It is left to ferment for 3 months to produce enzyme. The fermentation yielded a brownish liquid, which is separated from the solids. The solution was filtered after three months to obtain the enzyme solution. A white mould formation is observed on the top surface of the solution. They may be B complex yeast and vitamin C yeast. The solution will be obtained is of light brownish yellow colour. Then it will be transferred into the other clean plastic bottle. This enzyme will never expire. The longer we keep, the stronger it becomes. The power of the enzyme will be enhanced when water is added to it. It is only for the external use. It should not be stored in a refrigerator.

IV. Material Required

- Jaggery: 50gm

- Kitchen waste: (orange and musmi peels, neem leaves) 150 gm.
- Water: 500 gm
- Air-tight container or a plastic container.

Table no.1 Ingredients with Their Proportion

INGREDIENTS	PROPORTION%
JAGGERY	1%
KITCHEN-WASTE	3%
WATER	10%

V. RESULT

The data value analyses that the enzyme is workable and give the desired results. The effect of enzyme in the ganga water is increasing the quality of water and can easily be used in household and drinking purposes.

The results are given below in the table 3 and table 4:-

Table no.3 Comparison of Haridwar and Rishikesh water quality

Parameter	Haridwar water without enzyme values	Rishikesh water without enzyme values
Dissolved Oxygen	4mg/l	3.33mg/l
BOD	3mg/l	4.05mg/l
TDS	120mg/l	285mg/l
Ph	7.01	8.2
Colour	3	5
Turbidity	3.85 NTU	28NTU
Alkalinity	168mg/l	180mg/l
Total Hardness	170mg/l	210mg/l
Total MPN	1600	1600
Nitrate Content	3.54mg/l	7.6mg/l
Sulphate Content	25mg/l	38mg/l
Chloride Content	10mg/l	9mg/l
Fluoride Content	0.01	0.05
Phosphorous Content	0.07mg/l	0.1mg/l
Chromium	0.38mg/l	1.66mg/l
Lead	0.009mg/l	0.25mg/l
Copper	0.04mg/l	0.08mg/l
Iron	0.21mg/l	0.28mg/l
Znic	0.03mg/l	0.27mg/l
Mercury	0.0001mg/l	0.0002
Cadmium	0.00015mg/l	0.00024mg/l

Table no. 4 Comparison of water quality between different location with enzyme by BIS chart

Parameter	According BIS permissible value	According BIS desirable value	Haridwar water with enzyme values	Rishikesh water with enzyme values
Dissolved Oxygen	4mg/l	5mg/l	7.18mg/l	6.33mg/l
BOD	1mg/l	2-3mg/l	0.5mg/l	1.05mg/l
TDS	2000mg/l	500mg/l	150.08mg/l	302.84 mg/l
Ph	9.2	6.5-8.5	7.11	7.9
Colour	May be extended up to 50, if toxic substances are suspected	5	3	4
Turbidity	5 TU	10 NTU	4.25 NTU	7.20 NTU
Alkalinity	600mg/l	300mg/l	120mg/l	158mg/l
Total Hardness	600mg/l	300mg/l	115mg/l	150mg/l
Total MPN	95% of samples should not contain coliform in 100 ml. 10 coliform / 100ml		23	23
Nitrate Content	No relaxation	45mg/l	1.94mg/l	2.86mg/l
Sulphate Content	400mg/l	150mg/l	45mg/l	58mg/l
Chloride Content	1000mg/l	250mg/l	50mg/l	60mg/l
Fluoride Content	1.5mg/l	1mg/l	0.02	0.07
Phosphorous Content	No relaxation	0.2mg/l	0.03mg/l	0.045mg/l
Chromium	No relaxation	0.5mg/l	0.08mg/l	0.2mg/l
Lead	No relaxation	0.5mg/l	0.086mg/l	0.32 mg/l
Copper	1.5mg/l	0.05mg/l	0.02mg/l	0.036mg/l
Iron	1mg/l	0.3mg/l	0.18mg/l	0.25

				mg/l
Znic	15mg/l	5mg/l	2.29mg/l	4.31 mg/l
Mercury	No relaxation	0.001mg/l	0mg/l	0.00 06m g/l
Cadmium	No relaxation	0.003mg/l	0mg/l	0.00 1mg/ l

VI. CONCLUSION

In Ganga river, organic enzyme is proved as one of the best solution for the treatment of raw water. The quality of ganga water is very low and by using this enzyme it provides better results. It is eco-friendly and provides a good environment as it helps to reduce the effects of harmful substances. It has the quality to reduce the harmful effects in water. It reduces the total coliform bacteria very effectively and also increases the amount of dissolved oxygen and reduces the amount of BOD present in water. It also helps to reduce the effects of heavy metals present in Ganga river. It also reduces the effects of soap from the water. It helps to maintain the water quality parameters.

It is used as multi-purposes like as a fertilizer, helps to increase aquaculture, used as a cleanser for house. Organic enzyme is providing the desired results of water quality parameters at a very low cost.

VII. FUTURE SCOPES

- Raw water can be easily treated by using this enzyme, to reduce the harmful effects.
- Chemical Industries can used this enzyme and add this into their waste water before dumping waste water into the river.
- By adding it into the soil, it increases the fertility of soil which help in increasing the crop growing rate.
- By mixing enzyme into the river the amount of dissolved oxygen increases so it also increases the aquaculture growth.
- It helps to maintain the water quality parameters and provide the better environment to the aqua-animals and plants.
- It reduces the foul smell from the raw water.
- It can be used as household cleaning, car cleaning, washroom cleaning.

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