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DESTRUCTION OF RESINOUS COMPOUND FROM WASTE BY USE OF NATURAL ENZYMES

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ABSTRACT

In present scenario huge quantity of waste are produced every day. It contains plastics, waste papers, plastic containers, some of these are degradable, and some of these are non-degradable waste. Non-biodegradable things are present in waste treated with mechanical pulverizing mechanisms and with few of strong chemical. Chemicals such as concentrated Hydrochloric, Sulphuric acids, sulphamic acids and many other hazardous chemicals are used for destroying wastes in simple form or in disperse form.

Almost 70% of the waste is being dumped in the soil layer. After certain interval of time compounds present in soils such as salts of the metals and temperature of soil help in decomposing the waste periodically. Due to this process large quantity of soil gets contaminated. In this project we have tried to replace hazardous chemicals with other non-hazardous chemicals and some natural enzymes, which may give same reactions as with toxic chemicals. Objectives may also helps in use of eco friendly chemicals for reducing soil pollution and water pollutions. Hence it will minimize the other impacts on environment such as air pollution, noise pollutions, water pollutions and soil pollutions. All process will carry out under Green Chemistry cycles.

Key words: *Non biodegradable waste material, Hazardous chemicals, natural enzymes, Green Chemistry*

PURPOSE

The objective of study is to recycle the huge quantity of degradable and non-degradable waste like plastic containers, paper napkins, paper towels etc by using naturally available waste so as to reduce the atmospheric and water pollution.

METHODOLOGY

80 – 85% commercial organizations are using different methods for destruction of polymers such as pulverizing, dumping, treatment of strong chemicals on polymers. In this paper we have tried to treat the polymer with naturally available resources. We have treated the PVA base, silicon base, poly coated, polypropylene, LDPE with resins impregnated products in polymers with pomegranate extracts, garlic extract , ginger extracts, muskmelon, water melon at temperature 52^0-53 ^{0}C and reaction time of 30-45 minutes. The 30% adhesive (sticky) material comes out in back water**.(1, 2, 3**) It has been found that very few industries using certain enzymes for recycling products are able to maintain good recycling water quality. This natural polymer helps in balancing the level of COD, BOD and alkalinity of effluent water. **(7, 9)**

We have also tried to maintain the concentration of hydrogen peroxide by using water melon. Results obtained after 24 hours show 1% less concentrations than that of 50.46% original concentration. Further optimization study matches exactly with the chemistry of peroxide chemicals**. (4, 8)**

Experiments were carried out in five sets with different proportions extracts of water melon, muskmelon, pomegranate, ginger and garlic. The waste under examination was taken in 250 ml beaker while maintaining 10% consistency in water bath temperature of 50 ^{0}C.

Set one, Muskmelon and water melon in proportion of (1:2) was initially kept for retention time of 20 minutes with reaction temperature 52 ^{0}C and pH 6.7. After the completion of reaction, only 4-10% dissolved resins were liberated in back water. In set two, though the ratio of muskmelon to water melon was increased to 2:3, under the same reaction conditions; but the proportion of dissolved polymers in water, remained constant. **Table1**

Set three, which was combination of Water melon, Pomegranate, Garlic (1:2:1), for reaction time of 20minutes, reaction temperature 54-55 ^{0}C and pH 6.6 gave slightly better results .18--20% dissolved resins in dispersed state were liberated in water as compared to previous set. Again the proportion of set four was changed to (1:2:2). Ellagic acid plays an important role in breaking the bonds in the supplement of Gingerol group. The combination of Pomegranate, Garlic and Ginger (2:1:2) with pH 5.8 – 6.2, reaction temperature 54-56 ^{0}C and retention time 20-25 minutes gave more turbid water and dissolved more polymer resins, than other sets .Around 30-35 % dissolved resins were observed in back water as indicated by the intensity of color in water**. Table 1**

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In set five, the proportion of Muskmelon, Pomegranate, Garlic and ginger was (2:2:2:1), reaction time 20-25minutes, reaction temperature 50-52 ^{0}C and pH 5.9 – 6.1. This set liberated almost 15% resins along with water. Set four gave good results in separating resins from waste and keeping them in dispersed state. **Table 1**

Particulars	Muskmelon	Water melon	Pomegranate	Garlic	Ginger	Percentage of resins in Back Water
Set 1	1	2	---	---	---	5
Set 2	---	1	2	1	---	8
Set 3	---	1	2	2	---	20
Set 4	---	---	2	1	2	32
Set 5	2	2	---	2	1	15

Table 1 Variation of resin in back water with the variation in set

FINDINGS

Table 2 & Slides 1, 2 indicates that the natural enzymatic juices obtained from herbs and fruits help in destruction of resinous compounds present in waste material like paper towel, paper napkin etc.
These experiments indicate that the enzymes present in the juices of herbs and fruits help in the dispersion of the resins in the back water, at certain temperature and in certain proportions only.
The higher the value of resins in back water, easier it is to precipitate and remove them and reconvert them into recycled products.

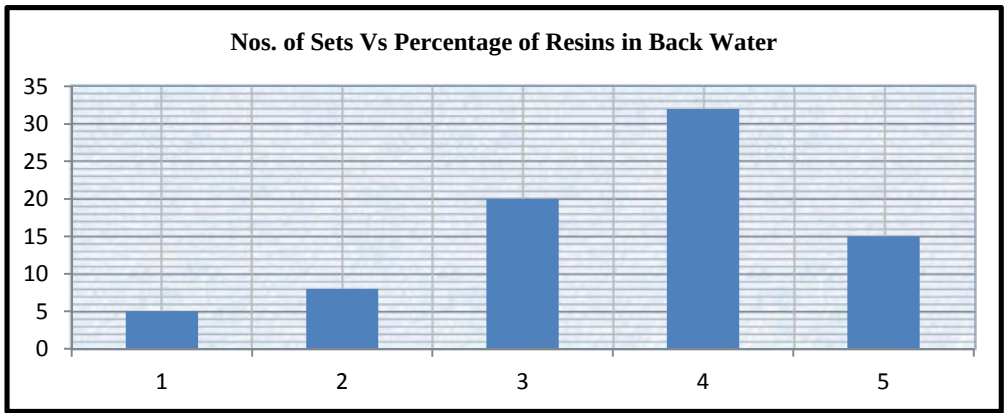
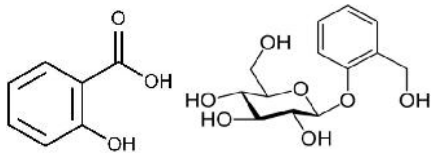


Table 2 Graph is based on above table data content the various proportions of extracts.
On X axis Sets labeled
On Y axis Percentage of Resins comes out in Back water after reactions.

Phenolic acid:



Salicylic compound Salicin compound

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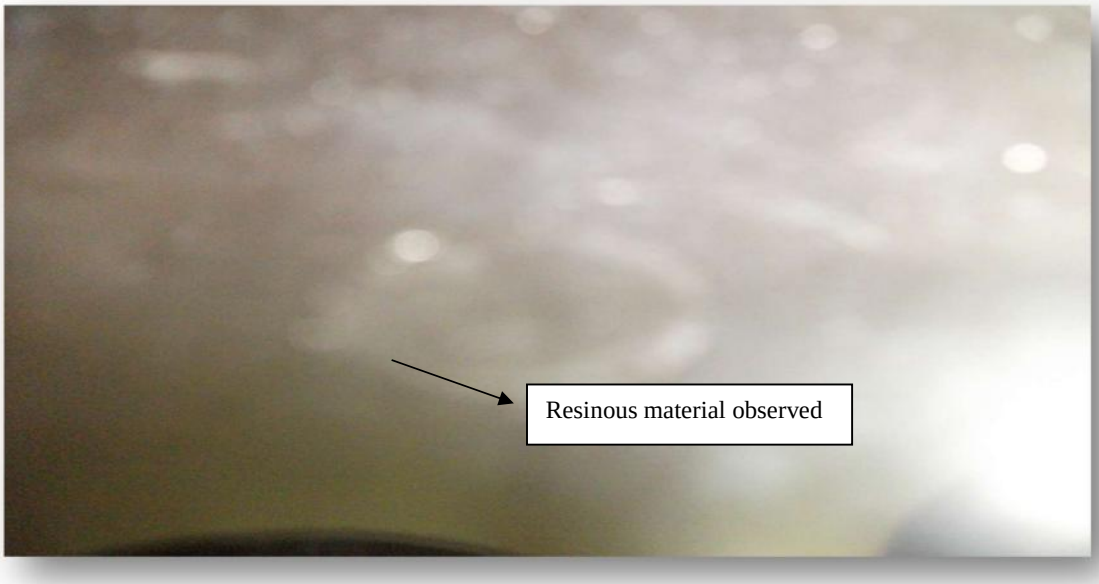
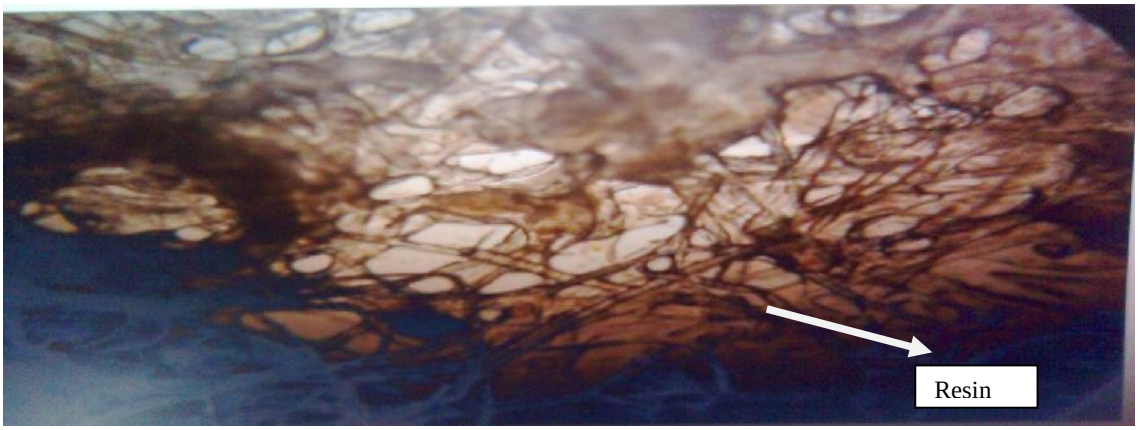


Slide 1: Above slide picture showing dispersing of stickies material with combination of pomegranate, Garlic & Ginger



Slide 2: This slide of combinations of Ginger, Garlic and pomegranate shows resins separated from each other

SOCIAL/TECHNICAL IMPLICATIONS

This research will change the waste dumping scenario of the country, resulting into clean and green country. It will also generate more jobs for skilled and unskilled work force.
As no high cost machinery is required for the process, so it can be easily utilized by the present industries to reduce the level of water, air and soil pollution already caused by the waste material generated during the manufacturing process.

ORIGINALITY/ NOVELTY

This is original idea, not utilized by any country till date. Our team is working on this idea and is trying to improve the quantity of turbidity obtained by using other natural enzymes. We are planning to present more papers on it in the national & international conferences to create awareness amongst public about the benefits of recycling and recycled products.

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