

# Optimum Utilization of Agricultural & Industrial Waste Oils by *Ganoderma Lucidium*

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## Abstract

In these modern era due to increase in technology, researches human being using various technique for finding product in low cost and time ,money saving .various oils are extracted derived from different parts of plants .Different methods of derivation cause more oil waste .these oil waste are formed in various industrial& domestic refineries like kohlus without treating thrown out in river and on land which cause damage to flora ,fauna in water and soil by forming oil film coating on water reservoir and on land which cause various water and soil pollution ,these oil wastes are causing destruction the animals live in water by blockage or respiration and air blockage. the various white rot fungus like reishi mushroom have the scavenging properties find out in various studies for bioremediation. Its various species are used in beverage industries like syrups, in teas coffees ,concoction are used widely in new generation due to its optimistic properties. The reishi mushroom have capacity of forming lignocellulosic complex ability which is dangerous for living plant, fauna. but this ability is used by human in beneficiary for human being and environment .This quantity is used for converting agrowaste & industrial waste into nutritive form.

The agrowaste and industrial waste like mustard crude oil, menthe oil ,eucalyptus oil waste are derived during extraction , distillation ,filtration processes. The methods used is growth promotion test, Pour plating for evaluation and sample are taken from different domestics sources. the sample preparation and processes includes sample taken in triplets. In this experiment these the crude oil waste are taken for conversion to productive form the experimental substrate for these oil are used to find out the reishi ability for bioremediation. The observation or finding are that the highest amount of colony are found in the mustard crude oil then Menthe oil then eucalyptus oil. these are derived from the mustard seed ,menthe plant parts and eucalyptus plant parts .the observation shows that this fungi convert the waste into qualitative and quantitative product.

## Keywords

Bioremediation, crude oils, *Ganoderma lucidium*, lignocellulolytic complexes.

## INTRODUCTION

Our ancestors worshipping the nature consisting of plants & animals because they know their importance in their lives.

They use plants parts for their benefit like as medicines, food ,foder, scents oils house making utensil furniture etc. They do various experiments to extracts various oils. the oils are volatile in nature [27].In modern era human due to development more refineries are form cause more crude waste oil [17].these crude oil waste are thrown on the land and water reservoir which cause environment pollution [18] [19]. The crude oil waste treatment is very long time consuming ,heavy costly. various methods searched to simplify ,cost effective .the *Ganoderma Lucidium* (reishi) mushroom [1] Reishi is cultivated by maintain growth parameters like temp, ph, water content humidity etc [2].is having scavenging properties is used and beneficial in removing waste oils act as scavenger for plant parts waste having lignocellulosic complex. The reishi use the plant debris and convert higher protein fiber contents is breakdown into smaller units,subunits and consumed easily.

## IMPORTANCE

Fungus Reishi is act as scavenger by breaking in minute level the plants parts waste ,crude oil waste by secreting their enzymes on the materials and engulf the materials and convert into biodegradable form. [20] [21] miraculously cause damage to trees by decaying their lignin [12]and hemicellulosic,lignin fibre content part with the help of the enzymes presents. these properties are used in better way in agrowaste products which cause many types of pollution and harsh for environment . Reishi is generally grown on woody trees in the wild nature. The are not grown in abundance and take long time to produce fruiting bodies to consume.so Reishi is grown artificially on waste mateirals [22] as a substrate in benefical way.

## METHODS AND MATERIALS

Swan culture of Reishi Mushroom Mycelium growth  
Strain sources: *Ganoderma lucidium*

From Directorate of mushroom research Centre SOLAN (H.P) , Media Malt Extract powder and Agar Agar type I, Reagents . Test procedure Following The all sterility requirements of glassware, media, sterile environment with

inoculating loop, Laminar Air flow, Burner lamp, etc. for preparing media plates inoculated with different serial dilution three times .

Sample taken under observation

Mustard oil waste

Eucalyptus oil waste

Mentha or peppermint oil waste

The method used growth promotion method in which the reishi is three fold serially diluted and poured with the media is having oils waste properly sterilized with the help of autoclaves and poured in sterile petri dishes and incubated for 24 to 48 hours and observed. The product under observation are Mustard oil waste, Eucalyptus oil waste, Mentha or peppermint oil waste taken from different extraction sources from domestic & is mall scale refineries.

Mentha oil is derived from herbaceous rhizomatous plant their leaves & flowers are long [3] [4] [5].this plant is fast growing and spread fastly because of their rhizomes. [27] the oil is are strong substances extracted from flower, leaves stem, barks resins and their fruits. [21]

The eucalyptus oil [7] is extracted from the wood chips ,leaves, stems the plant is tall in nature their leaves [26] are long and thin in nature .for [8] [9] oil extraction the fresh leaves are taken for good yield.

[10] Mustard oil is a small seasonal plant the oil is derived from the small round seeds [16] after ripening the seeds colour convert their colour to brown. [11] [15] The oils obtained by enzymatic action followed by commonly steam distillation [13 [14] these oils are used in various industries like pharmaceuticals food, baked foods, beverages, cold drinks. [2]during different extraction processes tones of materials are used and the pure outcomes is very small amount with maximum crude oil waste. the essential pure oils are used and crude waste are discarded many times untreated in the environment.

#### **Preparation of petri plates for Mycelial Cultures growth of the Reishi mushroom**

In this Experiment Mustard oil waste ,eucalyptus oil waste, mentha oil waste sample were extracted and remaining crude oil waste taken . after separating, Extracting, filtration & mix plate media in 10mg/20ml of the single plate in case of all crude oils & sterilized The conical flasks were closed with cotton plugs and were sterilized by autoclaving at 121°C (15 lb psig) for 15 minutes. The contents of the conical flasks were poured aseptically into sterile Petri plates are allowed to solidify with The mix of 1ml of given Reishi mushroom.

#### **Preparation of culture media for inoculum preparation**

The sterilized media were used to subculture the fungal culture. The Petri plates were incubated at 35±2,°C for 24 to 48 hours. Growth Activity should measure in no of colonies & diameter the average colony no for each sample was calculated. The count of colony obtained by the test sample was compared with that produced by controlled reference standard.

#### **Extraction method for oils**

various methods are used for the extraction of varies components like steam distillation extraction, hydro distillation extraction. [23] [24] the extraction extracted through hot water distillation,steam distillation hot air distillation etc. commonly steam distillation are used in households ,small scale refineries. [25] with the help of extraction methods various phytochemicals and antioxidants are derived and crude oils are left.

Different waste oils sample are collected from local house hold refineries. crude oils are gone through sterllization process and poured with the help of pipettes by using pour plating in different conical flasks, sterllized properly, pour plate in clean environment with moderate media temperature and stored under optimum condition for observation After the inoculation the mycelia of reishi is showing growth on petri plates monitored and measured at every 2 to 3 days regularly.

#### **COLLECTION OF DATA ANALYSIS**

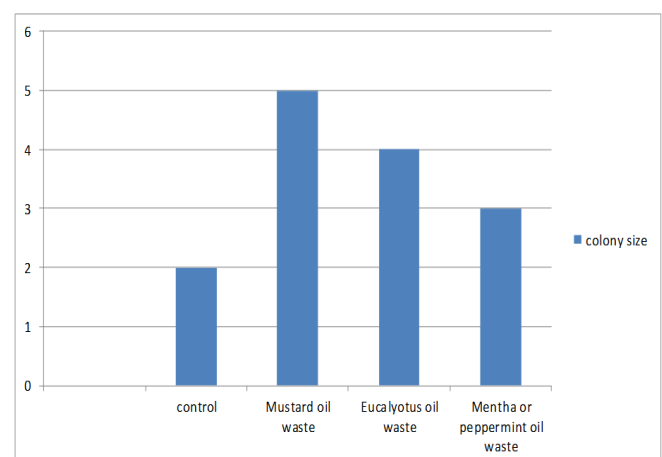
The data is collected every 2 to 3days by measuring on plates with mycelium fragmented growth in the form of colonies. the statically data is using standard mean ,standard deviation ,coefficient of correlation from triplicates .

**Collected data Table 1 shows the size of colony by pour plate method after three days**

**Table 1.**

Sno.	NAME	colony size (mm)
1	control	2.0mm
2	Mustard oil waste	5.0mm
3	Eucalyotus oil waste	4.0mm
4	Mentha or peppermint oil waste	3.0mm

**Figure 1 shows the growth of reishi colonies size on tripliate plates with the different crude oils. (Table 1.)**



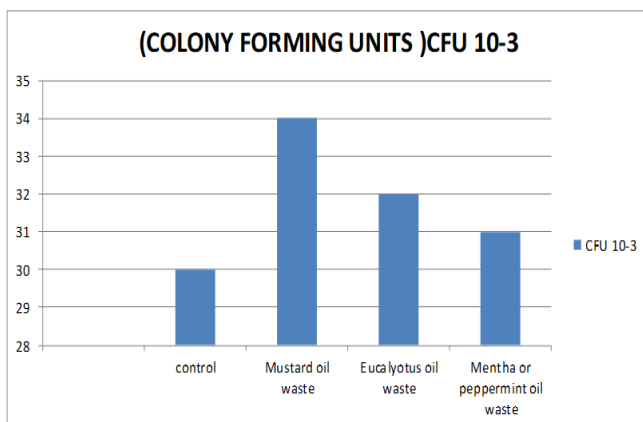
**Figure 1.**

Collected data (Table 2.) shows the Number of colonies of *ganoderma lucidium* after three Days by using growth promotion method

**Table 2.**

Sno.	Name of material	CFU count 10-3
1	control	30
2	Mustard oil waste	34
3	Eucalyotus oil waste	32
4	Mentha or peppermint oil waste	31

Graphical representation (Figure 2.) : Effect of the crude oil wastes on *Ganoderma lucidium* colonies (Table- 2)



**Figure 2.**

## DISCUSSION AND RESULTS

The above observation shows that used Mustard oil waste, Eucalyptus oil waste, Mentha oil waste on reishi mushroom, *ganoderma lucidium* cause increase in bioremediation of waste. The lignocellulosic activity of reishi on extracted crude oils examine on pour plate and spread plate method showing the colony growth in triplicates observation.

The Mustard crude oil waste show higher no of colony growth than Eucalyptus crude oil waste than Mentha crude oil waste. This experiment shows maximum no colony at minimum concentration as compare this indicates the Mustard crude oil waste act as more growth inducer than Eucalyptus crude oil waste than Mentha crude oil waste.

The observation shows that the Reishi is also grown on crude oils waste and convert into good usable form. The Reishi mushroom play a very good role cleaning the oils waste which cause oil film on water reservoir cause harm to water animals and natural microorganism which degrade the waste degradation phenomena in water and on land.

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