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## **A Comparative Study of Antimicrobial Activity of Crude with Branded Medicinal Plant Oil**

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### **ABSTRACT**

For various health related problem medicinal plant oils are widely used in traditional Indian society. In present study Antimicrobial activity of different crude oils compare with standard medicinal oils. Crude oils are extracted from different parts of plants such as leaves of Eucalyptus globulus (Eucalyptus oil), Flower buds of Eugenia caryophyllus (Clove oil), Leaves of Cymbopogon citritis (Lemon grass oil), seeds of Ricinus communis (Castor oil), and seed of Sesamum indicum (Sesam oil) by using Steam distillation process. The antimicrobial activity of these crude oils with standard medicinal oil was studied by disc diffusion method, against one gram +ve Bacterial species Bacillus subtilis,two gram -ve Klebsiella pneumonia & Pseudomonas aeruginosa and one fungal strain Aspergillus niger. Comparing zone of Inhibition of crude oils with standard oils and also perform the phytochemical test for crude & standard oils.

**Keywords:** Antimicrobial activity, Clevenger apparatus, Medicinal plant oil, phytochemical test

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## INTRODUCTION

Medicinal plants are a rich source of antimicrobial agents. Plants are traditionally used medicinally all over the world and are a source of many potent and powerful drugs a wide range of different parts of medicinal plants are used to extract a raw drug. Which posses varied medicinal properties of the different parts such as root, stem, flower, fruits, twigs, exudeds and modified plant organs.<sup>(1)</sup>

The antimicrobial properties of essential oils have been known for many centuries. In recent years a large no. of essential oils and their constituents have been investigated for their antimicrobial properties against some bacteria and fungi. Medicinal plant oils are mostly essential oils. Essential oils are also known as volatile oils, ethereal oils etc. essential oils are aromatic, oily liquid distilled from various plant parts such as flowers, buds, seeds, leaves, twigs by extraction methods such as Steam distillation, solvent extraction methods, cold pressing method.<sup>(1,2)</sup>

Clove is an important herb due to its medicinal values people use its oils, dried flower buds, leaves and stems to prepare herbal medicines.<sup>(1)</sup> Now a days, commercially, it is used directly to the gums for Toothache, for pain control during dental work.

Eucalyptus oil having Antiseptic abilities and used in Mosquito repellent. Lemongrass oil is used as a pesticide and preservative, it is also as an antifungal agent. lemongrass tea can be used to treat fever, cold, cough and stomach upset. The tea can also help to treat typhoid fever, blurring of vision and cancer.<sup>(2)</sup>

Castor oil having anti-inflammatory ability used in prevention of Osteoporosis, Nasal cleansing relief from Rheumatism & Gout, Menstrual disorders, Sesam oil also have medicinal value used as an Anti-fungal and Anti- microbial.<sup>(1,3)</sup>

## MATERIALS AND METHOD

### Microbial Strain

The Bacterial strain such as *Bacillus subtilis* (Gram positive), *Klebsiella pneumonia* & *Pseudomonas aeruginosa* (Gram negative) & *Aspergillus niger* (Fungi).

### Chemicals

All the chemicals and solvents used in this research work study were analytical grade. Nutrient agar plate for antimicrobial activity were obtained from the Pharmaceutical Microbiology lab of K. T. Patil College of Pharmacy, Osmanabad. Nutrient agar plate Culture Broth of each

microbial strain extracted crude oil, standard oil, ethanol, Ferric chloride, Petroleum ether, Sodium nitrite, Glacial acetate, 1% solution of sucrose in HCL.

### **Preparation of Inoculum**

Loop full of culture of given microbial strain from respective slants was inoculated in 5ml sterile nutrient broth and incubated at 37<sup>0</sup>c for 24hrs. <sup>(3,4)</sup>

### **METHOD**

#### **Antimicrobial activity by Disc Diffusion method:**

Preparing nutrient agar plate, introduce fully growing bacterial culture broth (2-3 drops) into the Petri dish containing agar medium, then spread it in all over the plate by tilting, Make a cup-plate by using sterile metal borer. Each plate carry two cup-plates, one responses for standard oil & another for crude oil, Fill up the cup-plate by respective standard & crude oil, introduce the plates carefully in a refrigerator for 1 to 2 hrs and remove the plates from refrigerator and transfer to incubator for 24 hrs at 37<sup>0</sup>c, for observing & comparing the zone of inhibition. <sup>(4,5)</sup>

### **RESULTS AND DISCUSSION**

For observing the antimicrobial activity firstly we can use bacterial strain of *Bacillus subtilis*. We take *Eugenia caryophyllus* (clove oil), *Eucalyptus globulus* (*Eucalyptus* oil), *Cymbopogon citratus* (*Lemongrass* oil), *Sesamum indicum* (*sesam* oil), *Ricinus communis* (*castor* oil) for assessing antimicrobial activity & compare with standard oil. We check first standard concentration of crude & standard medicinal plant oil. So we carry activity starting from 50 $\mu$ l sample of each medicinal plant.

We make two cup-plate for two different standard oil & another for two different crude oils. Our result showing that standard sample have little antimicrobial activity but crude sample did not show antimicrobial activity against *Bacillus subtilis*.

In next aspect, we increase the concentration up to 75 $\mu$ l. with same microbial strain of *Bacillus subtilis*. Our result showing that, the standard Sample show stronger antimicrobial activity than the crude sample.

In next aspect we increase the concentration up to 100 $\mu$ l and change the pattern of cup-plate, signal plate having two cup-plates one for std. & another for crude of same sample. We check the antimicrobial activity, after comparing the zone of inhibition we saying that std. oils have the proportionate activity with our crude but some std. fails to come with crude.

At 100µl we observe the increasing activity than previous concentrations then we can fix the concentration of 100µl. We check the antimicrobial activity at 100µl against *Klebsiella pneumonia*, *Pseudomonas aeruginosa* (gram-ve), & *Aspergillus niger* (fungal strain).

**Table 1: Phytochemical test of extracted crude oil**

Oil	Test	Result
1 Clove Oil	Clove oil + Ferric chloride 5% solution	Blue coloration. (due to Eugenol) <sup>(2,6)</sup>
2 Eucalyptus oil	2.5ml of eucalyptus oil + 5ml purified petroleum benzins + 5ml solution of sodium nitrite ( 5gm sodium & 8ml of purified water). + then add 5ml glacial acetic acid	Phellandrene nitrite do not form in the mixture within 10min. <sup>(2)</sup>
3 Sesam oil	Shake 2ml sesam oil with 1ml 1% solution of sucrose in HCL.	pink or red color is produced. (due to sesamol) <sup>(6)</sup>

**Table 2: Antimicrobial activity of Medicinal plant oil at concentration 100µl**

Oils	Clove oil		Eucalyptus oil		Lemon grass oil		Sesam oil		Castor oil	
	Std.	Crude	Std.	Crude	Std.	Crude	Std.	Crude	Std	Crude
Organisms										
<i>Bacillus subtilis</i>	8mm	7mm	10mm	6mm	NI	NI	NI	NI	NI	NI
<i>Klebsiella pneumonia</i>	8mm	10mm	NI	NI	NI	NI	8mm	1mm	NI	NI
<i>Pseudomonas aeruginosa</i>	7mm	9mm	10mm	3mm	6mm	3mm	1mm	NI	NI	NI
<i>Aspergillus niger</i>	10mm	8mm	14mm	8mm	NI	NI	3mm	1mm	NI	NI

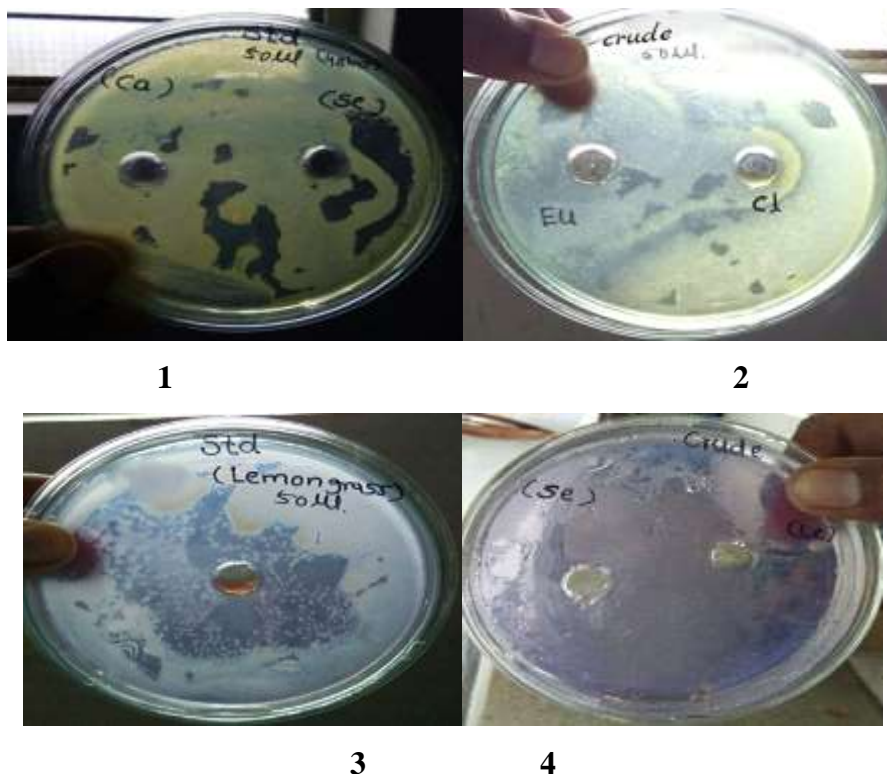


Figure 1: Antimicrobial activity at 50µl against Bacillus subtilis

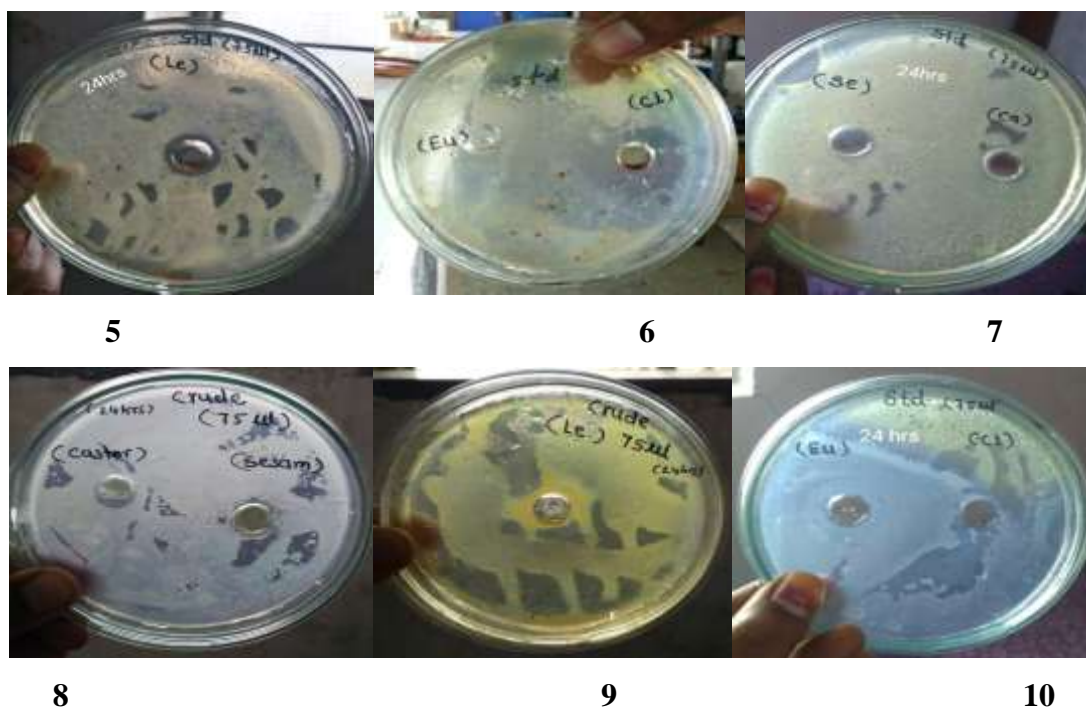


Figure 2: Antimicrobial activity at 75µl. against Bacillus subtilis.

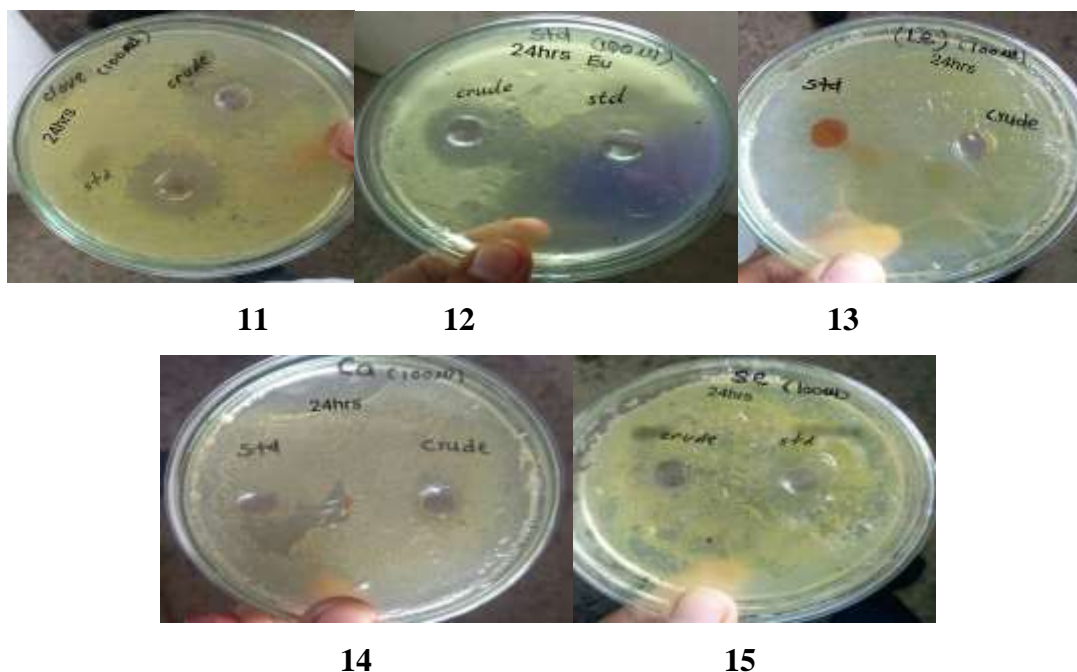


Figure 3: Antimicrobial activity at concentration 100µl against Bacillus subtilis.

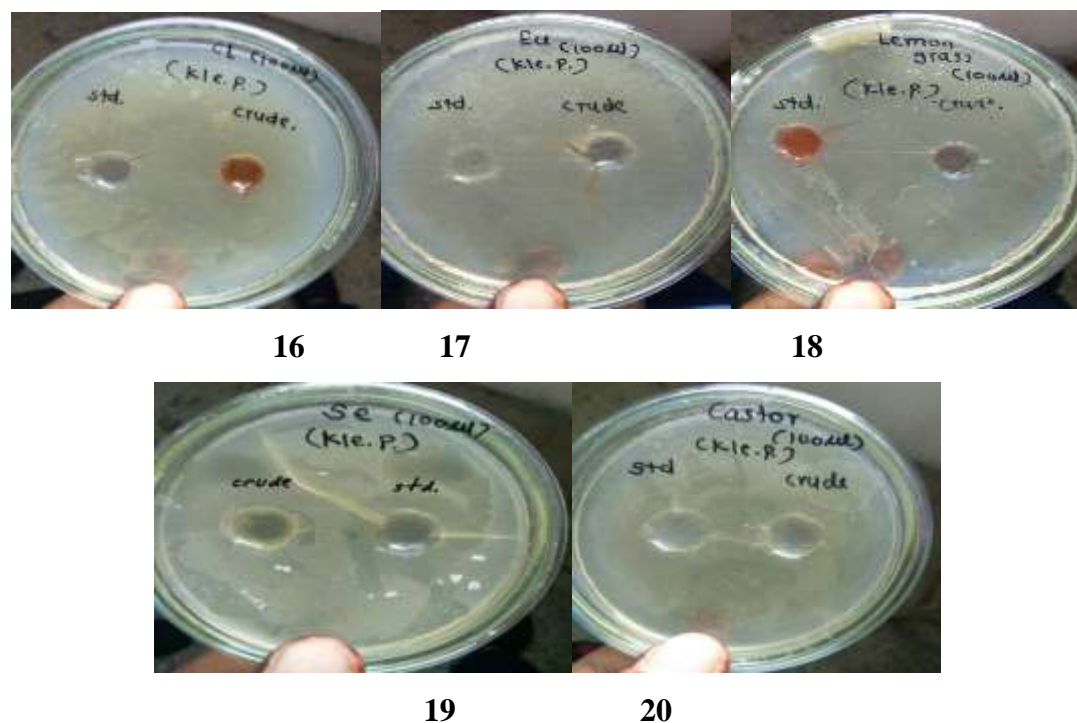


Figure 4: Antimicrobial activity at 100µl against Klebsiella pneumonia.

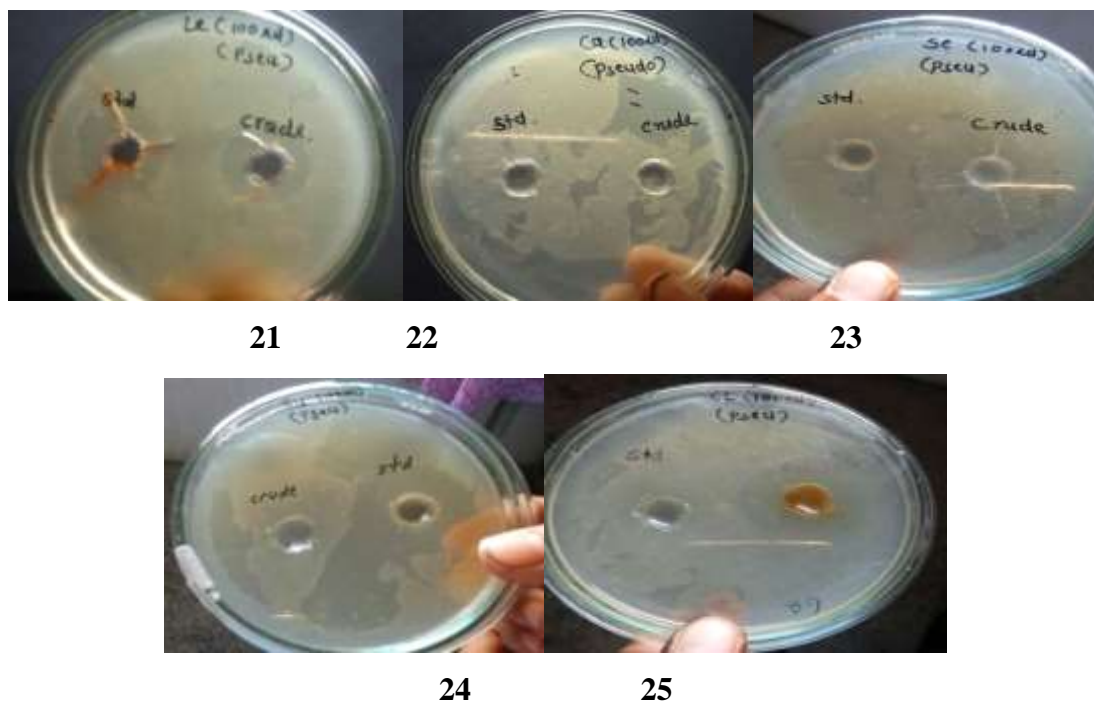


Figure 5: Antimicrobial activity at 100µl against Pseudomonas aeruginosa.

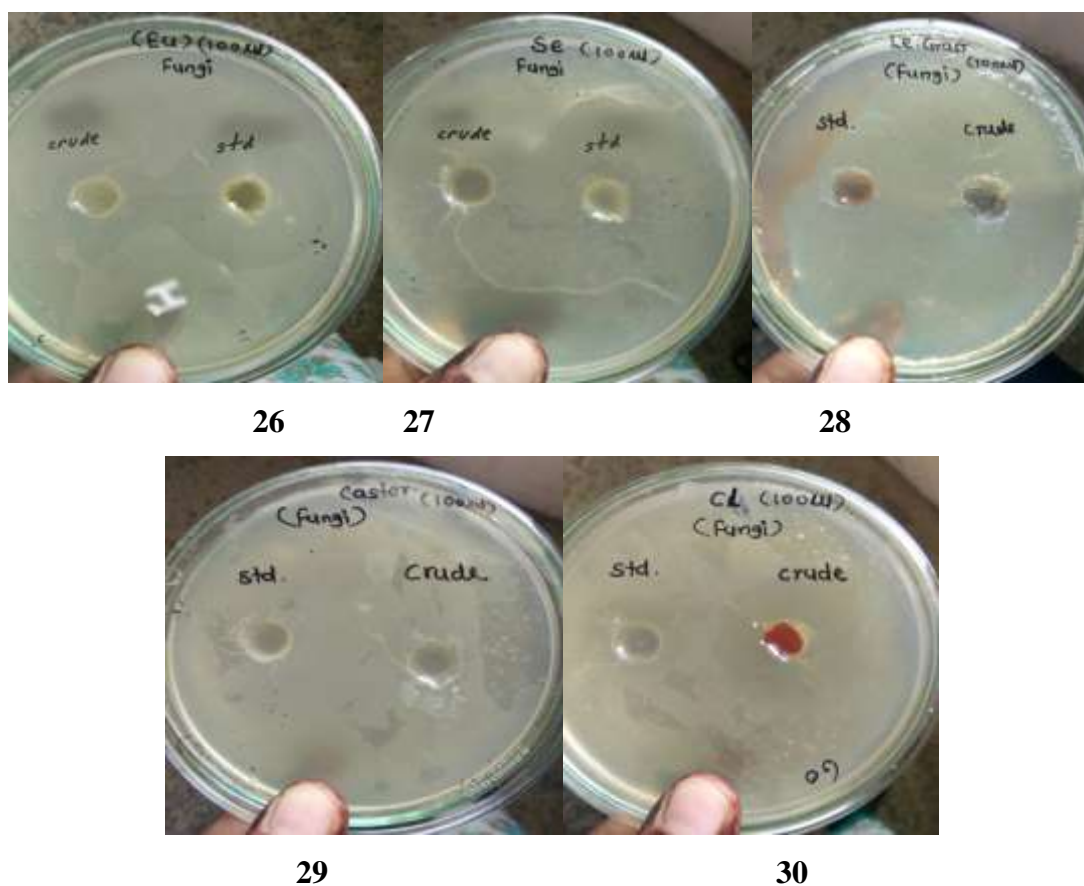


Figure 6: Antimicrobial activity at 100µl against Aspergillus niger.

## CONCLUSION

From the above work we conclude that:- 100µl is the sufficient concentration for showing the good antimicrobial activity against *Bacillus subtilis* (gram+ve), *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* (gram -ve) & *Aspergillus niger* (Fungi). The standard oils have the stronger activity than our crude oil but some standard fails to come with crude.

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