

# Anti Microbial Activity of Jojoba Oil against Selected Microbes: *An Invitro Study*

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## Abstract

**Aim:** To evaluate the anti- microbial activity of jojoba oil against selected microbes.

**Objective:** The study is to determine the anti-microbial activity of jojoba oil against selected microbes.

**Background:** Jojoba oil is the liquid produced in the seed of the *Simmondsia chinensis*. It is used as a replacement for whale oil and its derivatives, such as cetyl alcohol. It is found as an additive in many cosmetic products, especially those marketed as being made from natural ingredients. In particular, such products commonly containing jojoba are lotions and moisturizers, hair shampoos and conditioner. Effect of jojoba oil on *E. coli*, *pseudomonas species*, *klebsiella species* and *Staphylococcus aureus* is determined.

**Reason:** This study is to evaluate the anti microbial activity of jojoba oil against *E. coli*, *pseudomonas species*, *klebsiella species* and *Staphylococcus aureus*. This may help in the development of other products with jojoba oil as its constituent.

**Result:** The investigation of anti microbial activity of jojoba oil on selected positive and negative bacilli was done by agar well diffusion technique and its zone of inhibition was evaluated.

**Keywords:** Jojoba oil, *E. coli*, *pseudomonas species*, *klebsiella species*, *Staphylococcus aureus*, zone of inhibition, anti microbes

## INTRODUCTION

Since ancient times, plants have been a very good source of medicinal compounds that has continued to play a dominant role in the maintenance of human health[1]. Medicinal plants represent a rich source of antimicrobial agents. Jojoba oil is one amongst them. *Simmondsia chinensis* - C. Schneider commonly is known as jojoba and belongs to family Simmondsiaceae. It is the liquid produced in the seed of the *Simmondsia chinensis* (Jojoba) plant, a shrub, which is native to southern Arizona, Southern California. Unrefined jojoba oil appears as a clear golden liquid at room temperature with a slightly nutty odour. It has been reported as this plant extract is useful as a dietary supplement for use in a weight control regiment in humans, a component of functional food, a food additive, a medical food, or as a therapeutic agent. Different extracts from jojoba plant are widely used in many folk medicinal uses[2],[3]. It has also been reported that the essential oil and various extracts from seeds of Z.

Jojoba can be used as natural preservatives in food against the well-known causal agents of food-borne diseases and food spoilage[4]. The pure oil itself may also be used on skin, hair, or cuticles[6],[7]. Jojoba oil is a fungicide, and can be used for controlling mildew[8]. Jojoba oil is edible but non-caloric and non-digestible, meaning the oil will pass through the intestines unchanged and can cause a stool condition called steatorrhea[9].

Antimicrobial activity of spices depends on the type of spice or herb, type of food and microorganism, as well as on the chemical composition and content of extracts and essential oils. Currently there is a scientific awareness in the food industry for using plants in processed foods as natural antibacterial agents, e.g. essential oils and extracts

of various species of edible and medicinal plants, herbs and spices which have long been used as alternative source of synthetic antimicrobials for preservation in food and beverages due to the presence of antimicrobial compounds[10],[11]. Natural products have gained a special attention in the recent years because of increasing the phenomena of acquiring antibiotic resistance by different bacterial species[5].

Therefore, the aim of the present study was to screen the most important antimicrobial activity of extracts of jojoba against some selected microorganisms.

## MATERIALS AND METHOD

### Materials

Jojoba oil was obtained commercially. The Bacterial strains used were *E. coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Staphylococcus aureus*. The organisms were obtained from Department of Microbiology, Saveetha Dental College.

### Methodology

#### Agar well diffusion method

Broth culture of the test organisms compared to Mac Farland's standard 0.5 were prepared. Lawn culture of the test organisms were made on the Muller-Hinton agar [MHA- M1084] plates using sterile cotton swab and the plates were dried for 15 minutes. Well measuring 4 mm depth was made on the agar with sterile cork borer. 100µl of the essential oils were added to the wells. 0.2% of Chlorohexidine was used on the positive control. The plates were incubated overnight and the zone of inhibition of growth was measured in mm diameter. All the test were done in triplicate to minimize the test error.

### RESULT AND DISCUSSION

The investigation on antimicrobial activity of Jojoba oil against one gram positive cocci, *Staphylococcus aureus* and another three gram negative bacilli, *E. coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* was done by agar well diffusion technique. The zone of inhibition of the four bacterial strains along with control is recorded and tabulated in Table 1.

Table 1: The results of the antimicrobial activity on four different microorganisms.

	Zone of inhibition in mm diameter			
	E 1	E2	E3	E4
<b>Jojoba oil</b>	17	21	15	13
<b>Chlorhexidine</b>	28	30	26	24

**E1 - *Staphylococcus aureus*,**

**E2 - *E.coli*,**

**E3 - *Pseudomonas aeruginosa*,**

**E4 - *Klebsiella pneumoniae***

The essential oil showed favourable result against various bacterial strains tested. *E.coli* showed the maximum susceptibility towards the jojoba oil with 21mm zone of inhibition. The antimicrobial activity of Jojoba oil against *Staphylococcus aureus* showed zone of inhibition 17mm. With *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* the zone of inhibition was 15mm and 13mm respectively.

### CONCLUSION

It can be generally concluded that the obtained results indicated the various microbial activity of the sample, jojoba oil, against few selected microbes like *E.coli*, *pseudomonas* species, *klebsiella* species and *S. Aureus*. Hence this shows the possibility of using jojoba oil as natural sources and were also recommended to be used as natural preservatives in food against the screened bacterial species which cause food-borne diseases and food spoilage.

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