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## Antimicrobial properties of natural Ayurvedic massage oils from Kerala, the land of spices in India

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### ABSTRACT

*This project aims to explicitly comprehend the anti microbial properties of different types of ayurvedic massage oils. Ayurvedic oils are believed to possess ingredients that contain the ability to inhibit the growth of certain microbes. A large number of microbes are pathogenic and tend to impair and interfere with a plethora of human mechanisms and activities. This project demonstrates the outcome of ten diverse varieties of oils on the culture media that was prepared specifically for this experiment. The result has been substantiated with the examination of the various culture media and oil interaction via disk diffusion method. Kerala which is located in the extreme south western part of India has had a great historical significance in the trade of spices and various oils with some of the greatest ancient empires of the olden times. Ayurvedic oils are used for providing massages and they show an astounding ability to cure diseases including some stress related diseases through physiotherapy. When some ayurvedic oils like Balahatadi thailam, Thekaraaja keram and Pinda thailam were used in this experiment, they displayed some sturdy antimicrobial property against the samples that we used in this experiment namely Escherichia coli and Staphylococcus aureus and the maximum zone of inhibition was seen in the Balahatadi thailam with a radius of 1.8 cm*

**Keywords:** Kerala massage oils, keram, thailam, antimicrobial, kuzhampu

### INTRODUCTION

Ayurveda is an ancient system of medicine deeply rooted in the culture and tradition of the southern state of Kerala. Ayurveda uses medicines derived from plants, herbs and other natural sources and it implements the knowledge of preventing the disease and eradicating its root cause. The modern world has accepted Ayurveda as an authentic medical practice.[1,2,3,6,7]

Kerala, the land of spices well endowed with fertile land and abundance of rainfall, sustains a variety of herbs, spices and other species of plants which flourish in the tropical climate of the state. It is home to the practice of Ayurveda. During ancient times, teachings of Ayurveda had been passed on over generations orally. Later, manuscripts written on palm leaves were also used for the purpose. [4,7,8]

Massage oils, used for relieving pain and stress, against skin infections and for curing various diseases, constitute a major component of Ayurveda. They are widely used in all parts of the world and a growing percentage of people have accepted this as an effective and reliable method of treatment. Massage oils can be categorised into three main types, namely Keram, (having base as ghee), Thailam, (having base as gingelly oil) and Kuzhampu, (having base as coconut oil). Kuzhampu is applied below the neck whereas thailam and keram are primarily applied on the head.

Previous studies conducted on oil established its antimicrobial effect[1]. Studies were also conducted on plant oils with promising results[2]. Inhibitory effects on microbes were also observed in the case of spice essential oils[3]. The effects of various ayurvedic oils on inflammatory agents were also studied[4,12].

This project primarily focuses on testing the antimicrobial properties of Ayurvedic massage oils. The massage oils were collected from a renowned ayurvedic centre in Kerala. The bacterial cultures used were those of *Escherichia coli* and *Staphylococcus aureus* due to their profound presence on the human skin.[5,8,11]

## MATERIALS AND METHODS

### Chemicals and raw materials

Medium was prepared by dissolving nutrient agar and agar powder in distilled water. Whatman filter paper was punched into 4mm discs. Petri plates were cleaned and sterilised. After which, fresh media, inoculated with previously prepared cultures of *Escherichia coli* and *Staphylococcus aureus*, were cultured for 24 hours to obtain  $5 \times 10^6$  cells/ml and were used for the assay.

### Collection and processing of samples

Oil samples were collected aseptically from the Nagarjuna Ayurvedic Centre located in Kottayam, Kerala.

They were preserved at room temperature for forty eight hours for stability and settling. The oils were used as such without further dilution. [10,11]



Fig.1: Oil samples collected from Nagarjuna Ayurvedic Centre

### List of oils

Table1: List of oils collected for the project

Hair Oils	Body Oils
Ksheerabala thailam	Sahacharadi kuzhampu
Balahatadi thailam	Dhanwantharam kuzhampu
Kayyunnyadi keram	Karpasaasthyadi kuzhampu
Thekaraaja keram	Kottamchukkadi kuzhampu
Dhanwantharam thailam	Pinda thailam

### Preparation of discs

Whatman filter paper No. 3 was punched to obtain discs of 4mm diameter, which were immersed in respective oil samples for a period of 2 hours. These were dried and preserved aseptically.

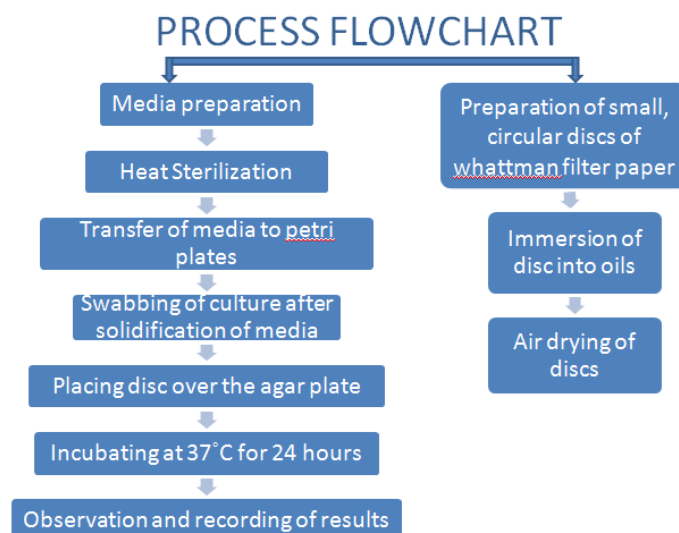


Fig.2: Process flowchart

**Antimicrobial property assay****Disc diffusion method**

All facets of agar disc diffusion method are to safeguard homogenous and authentic developments. Sterile petri plates were taken and agar medium was poured slowly into the petri plates. After the solidification of the agar, the bacterial culture was swabbed over the agar using sterile swabs. The prepared whatman filter paper discs were placed over the agar medium and 2 drops of oil were later added over the filter paper for homogenous results. The petri plates were then sealed using paraffin paper and were incubated at 37°C for 24 hours. Results were then observed and zone of inhibition, if any, were recorded.

**Well diffusion method**

In well diffusion method, tiny wells are made in the centre of the agar plate and a small quantity of the oil was poured in the well and then the plates were wrapped and sealed and finally kept for incubation at 37 degree centigrade for a duration of 24 hrs.

**RESULTS AND DISCUSSION**

After twenty four hours of incubation, the results of the experiments were observed and recorded. Microbial growth was observed in all of the plates with some showing inhibition zones.

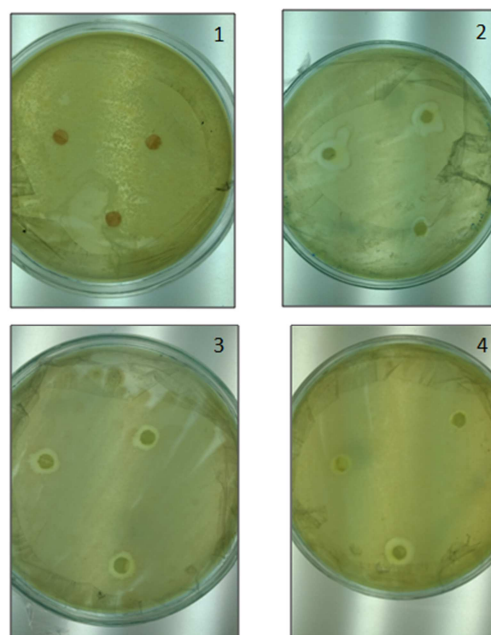


Fig.3: [1] Action of Pinda thailam on *Escherichia coli*, [2] Action of Ksheerabala thailam on *Staphylococcus aureus*  
[3] Action of Balahatadi thailam on *Staphylococcus aureus*, [4] Action of Thekaraaja keram on *Staphylococcus aureus*

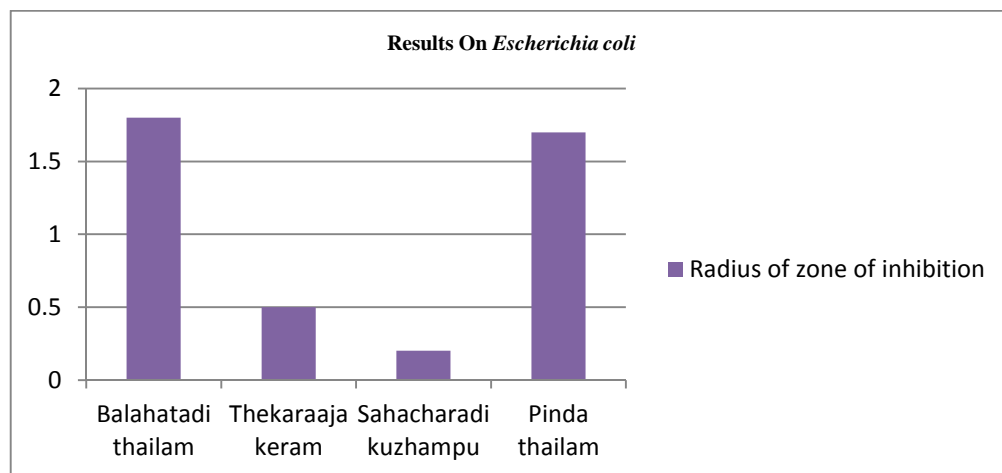
The following tables summarise the result of the experiment:

**Table2: Radius of zone of inhibition observed for *Escherichia coli***

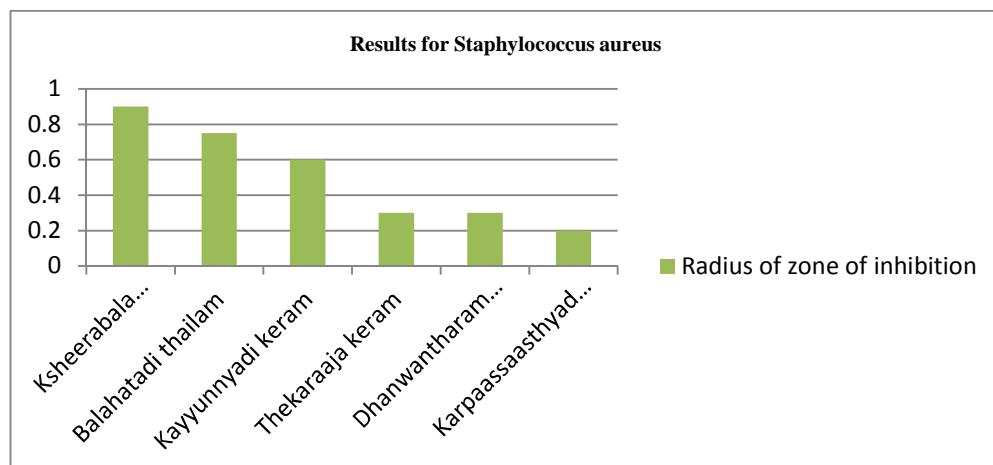
S.No	Oil sample	Zone of inhibition	Radius of zone of inhibition (cm)
1	Ksheerabala thailam	Absent	NA
2	Balahatadi thailam	Present	1.8
3	Kayyunnyadi keram	Absent	NA
4	Thekaraaja keram	Present	0.5
5	Dhanwantharam thailam	Absent	NA
6	Sahacharadi kuzhampu	Present	0.2
7	Dhanwantharam kuzhampu	Absent	NA
8	Karpaassaasthyadi kuzhampu	Absent	NA
9	Kottamchukkadi kuzhampu	Absent	NA
10	Pinda thailam	Present	1.7

**Table3: Radius of zone of inhibition for *Staphylococcus aureus***

S.No	Oil sample	Zone of inhibition	Radius of zone of inhibition (cm)
1	Ksheerabala thailam	Present	0.9
2	Balahatadi thailam	Present	0.75
3	Kayyunnyadi keram	Present	0.6
4	Thekaraaja keram	Present	0.3
5	Dhanwantharam thailam	Present	0.3
6	Sahacharadi kuzhampu	Absent	NA
7	Dhanwantharam kuzhampu	Absent	NA
8	Karpaassaasthyadi kuzhampu	Present	0.2
9	Kottamchukkadi kuzhampu	Absent	NA
10	Pinda thailam	Present	0.2



**Fig.4: Results on *Escherichia coli***



**Fig.5: Results on *Staphylococcus aureus***

The results indicated that certain ayurvedic massage oils have antimicrobial properties. Promising results were obtained in the case of Balahatadi thailam, Thekaraaja keram and Pinda thailam which displayed antimicrobial properties against both the organisms which were being used in the experiment.

Strong antibacterial properties were exhibited by Balahatadi thailam against both the organisms that were studied. Results of Pinda thailam showed strong antibacterial activity against *Escherichia coli* and weak antibacterial properties against *Staphylococcus aureus*. Strong antibacterial property was also indicated by Ksheerabala thailam against *Staphylococcus aureus*. Moderate results were obtained in the case of Thekaraaja keram against *Escherichia coli* and Kayyunnyadi keram against *Staphylococcus aureus*. Sahacharadi kuzhampu appeared to have weak antimicrobial properties against *Escherichia coli*, Thekaraaja keram and Karpasaasthyadi kuzhampu had similarly weak anti microbial properties against *Staphylococcus aureus*.

### CONCLUSION

The results of the assay suggest that ayurvedic massage oils, such as Balahatadi thailam, Thekaraaja keram, Pinda thailam etc posses significant antimicrobial properties against microorganisms commonly found on human skin. Balahatadi thailam showed maximum inhibitory activity against microbes.

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