



**ANTIDANDRUFF ACTIVITY OF THE ESSENTIAL OILS**

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**ABSTRACT**

Potential inhibitory effect of *Curcuma longa* (turmeric), *Mentha piperita* (peppermint), *Pinus sylvestris* (pine) and *Cinnamomum verum* (cinnamon) oils alone against the yeast like fungus, *M. furfur* which causes dandruff have been studied by using Disc diffusion method. The diameter of the inhibition zone of the *Curcuma longa* (45 mm), *Mentha piperita* (17 mm), *Pinus sylvestris* (16 mm) and *Cinnamomum verum* (15 mm) was greater than the inhibition zone of the standard antibiotic (Clotrimazole) 13mm respectively. These judgments suggest that all of these essential oils can be used as an herbal medicine for the treatment of Dandruff.

**KEYWORDS:** *Curcuma longa*, *Mentha piperita*, *Pinus sylvestris*, *Cinnamomum verum*, *M. furfur*, Clotrimazole etc.

**INTRODUCTION**

The word 'antidandruff' is used for the prevention from dandruff. Dandruff is the most common fungal infection of the scalp which affects almost all age groups. It is the enormous peeling of the dead skin cells from the scalp. It is frequently occur after the puberty age and affects males more than females (Agarwal et al, 2009). It can be cause by the number of factors including dryness of scalp, sensitive to hair products, skin conditions such as psoriasis, seborrheic dermatitis or eczema. As the skin cells die, small amount of flaking is normal and after the treatment of detergent there is about 487,000 cells/cm<sup>2</sup> get released normally (Ranganathan S et al, 2010). It is characterized by white to whitish yellow, dry and loose scaling of the scalp. Dandruff may spread through redness, irritation or increasing scaling of scalp to seborrheic dermatitis and both of these conditions are examine to be the same disorder to the different severity (Shuster et al, 1998). It may vary with season and as it is generally higher in winters. Several times dandruff is the main cause of the hair fall. There are about 40-50% population suffering from dandruff (Warner et al, 2001). It is generally caused by the *Malassezia* (fungi) which feeds on the nutrients of the scalp. There are about seven species of the *Malassezia* are identified. These are *M. globosa*, *M. restricta*, *M. obtuse*, *M. sloofea*, *M. sympodialis*, *M. furfur* and *M. pachydermatitis* (Warner J and Gueho, 1995). From these species, *M. furfur* is the main causative agent of the dandruff, which lives on the scalp and obtains their food from the skin oils. Poor hygienic conditions, warm and humid atmosphere and overcrowding are responsible for the growth of *Malassezia* (Rippon JW (1982). Essential oils are the

mixtures of the components of the volatile lipophilic, which are commonly, obtain from the leaf, twig, wood pulp and bark tissue of the higher plants (Asakawa et al, 2012). They are slightly soluble in water. There are several methods for obtaining essential oils from plant parts such as hydro distillation, steam distillation, cohobation, maceration and enfleurage are the most traditional. The essential oils have been used for the various purposes for thousands of years (Jones and F.A, 1996). There are large variation in the yield and chemical composition of different essential oils which depends on the herbal source, chemotype of the plant species and analytical methods used (Jardim et al, 2008). The function of the essential oils in plants is not well recognized but they are generally used as soaps, perfumes and for industrial products such as insecticides for paints and as a flavoring agent for food products like soft drinks, candies, pickles etc and basically they are used in pharmaceuticals as well as in the medical science (Rahuman et al, 2008). Several essential oils also shows medicinal importance and activities such as antimicrobial, antibacterial (Sharma et al, 2009), antifungal activities (Simic et al, 2004). The aim of this study is to observe the antidandruff activity of the essential oils.

**MATERIALS AND METHOD**

**Collection of Samples**

Thirty Dandruff samples were collected from the Scalp of the patients who was suffering from Dandruff.

### Isolation and Identification of the fungus from the samples

The Dandruff samples were incubate on the SDA media. The medium and Petri plates were autoclaved for sterilization. Then the media was poured in the sterilized Petri plates and leave these for 20 minutes to solidify. After the solidifying of media in the Petri plates, the sample of the Dandruff was sprinkled on the media and the Petri plates are covered by parafilm to reduce the chances of contamination. The Petri plates were incubate at 30<sup>o</sup>c for 2 to 3 days for the growth of fungus. Then the slide of the growth of the fungus was made and Lactophenol cotton blue dye was used to stain the fungus. There was several blue colour, spherical shaped with bottleneck colonies of *M. furfur*.

### Screening of the Essential Oils by Disc Diffusion Method

The essential was screened for the antidandruff activity against *M. furfur* by Disc diffusion method (Rios et al, 1988). Standard size (6.0 mm in diameter) Whatman No.1 filter paper discs were sterilize by autoclave at 121<sup>o</sup>c and 15 lbs pressure for half an hour and these discs were used to determine antidandruff activity. SDA medium for the disc diffusion test were prepared. After sterilization, the media was poured in to the sterilized Petri plates and allow these to solidify. The spore suspension of the Dandruff was made and vortex it. The spore suspension of the Dandruff was prepared from 8 to 10 days old. The sterile filter paper discs were soaked into neat, undiluted (100%) concentration of single oils for 1 to 2 hours. Using a sterilize cotton swab, the culture were swabbed on the surface of the sterile SDA plates. Then the discs ware placed on an agar plate containing fungal spore suspension by sterilized forceps. Similarly, solution of the standard antifungal drug (Clotrimazole) were prepared and impregnated into the filter paper

discs. Then the discs were placed over the plates with respective microorganisms. The plates were incubated at 30<sup>o</sup>c for 48 to 72 hours. The diameter of the inhibition zone was measured in millimeter. The activity of the oils was measured by the following formula:

Activity index = Inhibition zone of sample/ Inhibition zone of standard

### RESULT AND DISCUSSION

In present work, *M. furfur* was found the main causative agent of the Dandruff. There are number of antidandruff drugs and creams are available in the market. But in some cases, these are not successful to treat the dandruff due to their high prices, side effects and long duration of treatment. The essential oils are useful to treat dandruff due to their specific medical conditions.

There are numerous scientific studies which are proves the inhibitory effect of the essential oils against different fungi (Duarte et al, 2000 and Falahati et al, 2005). It is important to analyze that the plants which have been used in the medicines as a potential source of normal antimicrobial compounds (Mitscher et al, 1987). In the present study, reported the antifungal activity of the essential oils alone which are obtain from the *Curcuma longa* (turmeric), *Mentha piperita* (peppermint), *Pinus sylvestris* (pine) and *Cinnamomum verum* (cinnamon oil). The result of the antidandruff activity against *M. furfur* was studied by Disc diffusion method and result was compare with standard antibiotic (Clotrimazole). The diameter of the inhibition zone of all these essential oil was ranging between 15 to 45--mm. Turmeric oil showed the strongest Antidandruff activity against *M. furfur*. The inhibition zone of the *Curcuma longa* (Turmeric oil) against Dandruff was 45mm.

**Table 1. Antidandruff activity of the essential oils against *M. furfur*.**

Essential oil	Test Strain	Concentration of the oil used	IZ of the Sample (in mm)	IZ of the Standard, Clotrimazole	Activity index
<i>Pinus sylvestris</i>	<i>M. furfur</i>	100%	16 mm	13 mm	1.23
<i>Curcuma longa</i>	<i>M. furfur</i>	100%	45 mm	13 mm	3.46
<i>Mentha piperita</i>	<i>M. furfur</i>	100%	17 mm	13 mm	1.30
<i>Cinnamomum verum</i>	<i>M. furfur</i>	100%	15 mm	13 mm	1.15

**Activity Index** = Inhibition Zone of the sample / Inhibition Zone of the standard.

Similarly, the Cuminum cyminum (cumin) also shows the strongest antidandruff activity against *M. furfur*, which was (50 mm) (Nazeri et al, 2011). Previous details have indicated inhibition zones of 5.3—30 mm by different herbal plants against *M. furfur* (Vijayakumar et al, 2006). There was large difference between the Inhibition Zone of the essential oils when comparing with the standard antibiotic, these essential oils are found to be more effective in restrict the growth of *M. furfur*. It is clearly visible in the Table 1. The present work coincides with the Hammer et al who also reported the antimicrobial activity of 52 plant derived essential oils

against bacterial species (Hammer et al, 1999). Practical uses of the activities of the essential oils have long been suggested in humans and animals, but it has been reported in the last years that some essential oils are able to inhibit the food borne pathogens. (Conner & Beuchat 1984; Kim *et al.* 1995; Smith-Palmer *et al.* 1998). The use of essential oils in treatment and prevention from infection has been in demand in the field of research from the past (Sherry et al, 2001). Both of these oils can be used for the development of the natural antifungal agents against *M. furfur*. The universal use of plants as medicine give the basis for proves that which essential oils and plant oils may be useful for specific medical conditions are safe without any side effect. Inhalation of vapours of the essential oils kill invaders attached to the

inner respiratory lining and work synergistically with the body defences. The results of this study proved that by using essential oils, Dandruff and other fungal infection can be cure or prevent. Essential oils and their components are becoming increasingly prominent as naturally occurring antimicrobial agents. These results support the concept that plant essential oils and extracts may have a role as pharmaceuticals and preservatives.

### CONCLUSION

The present study suggest that the essential oils can be used for the treatment of dandruff from the scalp and found to be more effective as compared to standard drug (Clotrimazole). These essential oils (*Curcuma longa*, *Pinus sylvestris*, *Mentha piperita*, *Cinnamomum verum*) are eco-friendly, no side effects and alternative herbal treatment for Dandruff.

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