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Thyme Oil and Tea tree oil as Antidandruff Agents

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ABSTRACT:

In the present review we will discuss about the various herbs having anti-dandruff activity. Dandruff is a common disorder affecting the scalp condition caused by the fungus Melassezia furfur. Dandruff cannot be eliminated but can only be managed and effectively controlled. The review will provide us the data of the herbs which are effective antidandruff agents. Now-a-days, many herbal formulations are available in the market which contains herbal ingredients such as plant extracts and essential oils. The main reason for the demand for herbal cosmetics is the perception that these items are risk-free and unaffected by adverse effects. Herbs can be utilized unprocessed or can be extracted, refined, or derivatised to make them more cosmetic-friendly. Many different plant active ingredients, such as vitamins, bioflavanoids, enzymes, fruit acids, hormones, phyto-hormones, sugars, glycosides, tannic acid, and essential oils, are thought to be beneficial to remove dandruff. These compounds are present mainly in the plants like Henna (Lawsonia inermis), Neem (Azadirachta indica), Tea TreeOil (Melaleucaalternifolia), Rosemary (Benincasa hipsida), Lemon (Citrus limon), Thyme oil (Thymus vulgaris). Sources of information include various Review articles, Research Papers, various search engines like Google and websites like pubmed, Research Gate, Google Scholar etc. This review gives an exact status of the effectiveness of Antidandruff Herbs. After a thorough search, we could find out that which herbs are best options to manage Dandruff and getting formulated as a formulation.

Introduction

Dandruff is a common disorder in which shedding of dead skin cells occur from the scalp. It is caused by a fungus Malassezia furfur. These species are yeasts that comprise a part of the microflora of human skin. The scale is a cluster of corneocytes which have acquired cohesion with one another [1]. They get detached from the surface of stratum corneum and are abundant in regions supplied with sebaceous glands because of their lipid requirement for growth. Dandruff happens due to the increase in this fungus 1.5 to 2 times[2]. The word dandruff is Anglo-Saxon origin, a combination of "tan" meaning "tetter" and "drof" meaning "dirty". Itching, Flakiness, red and greasy patches occur due to dandruff [3]. The cause is unclear but believed to involve a number of genetic and environmental factors [4]. Real cause for dandruff is still not exactly known, however, various synthetic as well as herbal drugs have been used for the management of Dandruff. Antifungal synthetic drugs like Zinc Pyrithone, salicylic acid, Ketoconazole etc. can be used to manage dandruff [5]. There are several naturopathic agents which have been claimed to have antidandruff activity. However, in most cases, these naturopathic agents are used in combination with synthetic agents [6], [7], [8]. Studies from India have shown that the herbal preparations are as effective as synthetic substances in controlling dandruff both by *in vitro* and *in vivo* studies [9], [10], [11]. Various examples include some essential oils like Tea Tree oil, Thyme oil etc. [12]. Tea tree oil comes from the leaves of the Tea Tree (Melaleuca alternifolia). It grows in the swampy southeast Australian coast. The Tea Tree was named by 18th century sailors, who made tea that smelled like nutmeg from the leaves of the tree. People use Tea Tree oil for acne, toenail fungus and athlete's foot. It is also used for dandruff, lice, bad breath and other conditions. Applying Tea Tree oil 5% gel appears to work as well as Benzoyl Peroxidase 5% for treating acne. Tea Tree oil might work more slowly than Benzoyl Peroxidase, but it seems to be less irritating to the face. Applying 100% Tea Tree oil solution to the skin twice daily for 6 months can cure fungal toenail infections in 1 out of 5 people who try it. It seems to work about as well as clotrimazole 1% solution twice daily. Applying Tea Tree oil 10% cream works about as well as Tolnaftate 1% cream for improving symptoms of athlete's foot. Applying a stronger Tea Tree oil solution (25% or 50%) can help clear up the infection.

Journal of Chemical Health Risks

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But this higher concentration does not work like Clotrimazole or Terbinafine. When taken by mouth, Tea Tree oil is likely unsafe. It should not be taken by mouth otherwise it can cause serious side effects like confusion, inability to walk, rashes and coma. When applied to skin, it is safe for most of the people. It may cause skin irritation and swelling. In people with acne, it can sometimes cause skin dryness, itching, stinging, burning and redness.

Tea Tree oil has most commonly been used by adults in gels, shampoos, body washes, mouth rinses, sprays and creams in concentrations ranging from 5% to 50%. A small amount of research has been done on the topical use of Tea Tree oil for health conditions in humans on the conditions like acne, lice, athlete's foot, nail fungus etc. A limited amount of research indicates that Tea Tree might be helpful for acne and athlete's foot. One small study suggests that tea tree oil might help with nail fungus. But overall, the research is insufficient to allow clear conclusions to be reached about the use of tea tree oil for these conditions. Some early research shows that Tea tree oil might be promising for treating mite infections at the base of the eye lids (also called ocular demodicosis) [13].

Thyme Oil: Thyme, a traditional herb from the mint family has innumerable health benefits. The botanical name of this oil is Thymus vulgaris. It is native to western Asia and southern Europe. It is known by many common names like Thyme, Garden Thyme, French Thyme, Spanish Thyme, Van Ajwayan etc. It exists in 4 varieties- common thyme, Red thyme, creeping thyme, caraway thyme and lemon thyme. Due to its antibacterial and expectorant properties, thyme essential oil is used as a remedy for few respiratory problems. It helps clear mucus and phlegm deposits from the nasal passage and provides relief from chest congestion. It also serves as a potent remedy for asthma, bronchitis, sinus, headache and pharyngitis. Recent researches suggest that essential oils present in thyme have a relaxing and soothing effect on veins and arteries. It also lowers cholesterol and prevents deposition of debris within the capillaries, which in turn prevents ailments like atherosclerosis and lowers the risk of heart attacks and heart blocks. The antispasmodic properties of thyme prevent harmful gases in the stomach and also interact with gastric enzymes thereby boosting digestion, relieving flatulence, abdominal pain, diarrhoea and irritable bowel syndrome. Thyme essential oil or its cosmetic products are packed with vitamin C and Antioxidants. The skincare products serve as a natural remedy for several skin problems including acne, pimples, rashes, cuts and scars. It also prevents oxidative sun damage, treats various signs of aging such as wrinkles and fine lines. Thyme essential oil is an essential ingredient in most of the hair-care products. Thyme based shampoos and hair serums help in hair growth, treats dandruff and lice and prevent hair fall [14].

Review

Chemical composition of Tea Tree oil:-

Tea Tree is composed of Terpene hydrocarbons mainly monoterpenes, sesquiterpenes and their associated alcohols. Brophy and colleagues examined over 800 Tea Tree oil samples by gas chromatography and gas chromatography-Mass spectrometry and reported approx. 100 components and their concentrations. The composition of Tea Tree oil may change considerably during storage, with p-cymene levels increasing and α- and γ-terpinene level declining. Light, heat, exposure to air and moisture all affect oil stability and Tea Tree oil should be stored in dark, cool, dry conditions [15]. Tea tree oil is defined by the International Standard ISO 4730 ("Oil of *Melaleuca*, terpinen-4-ol type"), containing terpinen-4-ol, γ-terpinene, and α-terpinene as about 70% to 90% of whole oil, while p-cymene, terpinolene, α-terpineol, and α-pinene collectively account for some 15% of the oil (table, right) [16], [17], [18]. The oil has been described as colorless to pale yellow having a fresh, camphor-like smell [19]. Tea tree oil products contain various phytochemicals among which terpinen-4-ol is the major component. Adverse reactions diminish with lower eucalyptol content [20].

Composition of M.alternifolia (Tea Tree) oil:-

Terpinen-4-ol	Viridiflorol
α – Terpineol	α –Pinene
Aromadendrene	γ –Terpinene
δ-Cadinene	α –Terpinene
Limonene	1, 8 Cineole

Journal of Chemical Health Risks

www.jchr.org

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Sabinene	Terpinolene
Globulol	p-cymene

[21]

Chemical composition of Thyme oil:-

Oil of thyme, the essential oil of common thyme (*Thymus vulgaris*), contains 20–54% thymol [22]. Thyme essential oil also contains a range of additional compounds, such as *p*-cymene, myrcene, borneol, and linalool [23]. Thymol, an antiseptic, is an active ingredient in various commercially produced mouthwashes such as Listerine [24]. Various studies have aimed to investigate the chemical composition and biological properties of Thymus vulgaris essential oil (EO). According to European Pharmacopoeia, the minimum content of EO in T. Vulgaris is 12ml/Kg, but the chemical composition shows variations. Six chemotypes of this plant reported geraniol, linalool, γ-terpineol, carvacrol, thymol, and trans-thujan-4-ol [25]. The chemical composition determined by GC/MS is as follows:-

α –Thujene	B –Phellandrene
α –Pinene	P-Cymene
β –Pinene	γ –Terpinene
β –Myrcene	Terpinen-4-ol
α –Phellandrene	Thymol
Carene	Caryophyllene
D- Limonene	Cyclohexane, 1methyl-4-(5-methyl-1-methylene-4-hexenyl)

[25]

Antidandruff Activity

1. Misar et al observed activity of different concentrations of Thyme oil i.e. 100%, 1%, 0.75%, 0.5% and 0.25%. The study was carried out by Agar diffusion method and zone of inhibition was measured for each concentration. Out of all the concentrations, 100% Thyme oil concentration exhibited inhibitory effects against Malassezia furfur [26].
2. A study conducted on Thyme oil on Malassezia species on dogs by Khosravi et al revealed that the Thyme oil possessed highest inhibitory effects against Malassezia species amongst all the other oils. Activity against Malassezia was done using broth Microdilution method [27].
3. Hammer et al evaluated the in-vitro susceptibility of Malassezia furfur to the essential oil of Melaleuuca alternifolia.The team worked on the Antifungal activities of Ketoconazole, Econazole, Miconazole and Melaleuca alternifolia (Tea Tree) oil against 54 Malassezia species. It was found to have activity against them. So the present study concluded clinical significance of Melaleuca in the concentrations from 5% to 10 %. The researchers conducted the study via both agar dilution assay and broth dilution assay. The MIC of both was noted. It was concluded that the Tea tree oil may be suitable alternative topical agent [28].
4. Hicham et al observed effects of Thyme oil extracted from Thymus vulgaris. MICs (Minimum Inhibitory Concentrations) and MLCs (Minimum Lethal Concentrations) were determined by poisoned food and dilution neutralization methods by the scientists. A positive activity eas n Lee et al evaluated Antifungal activity of Plant essential oils against Malassezia furfur. The scientists analysed the antifungal effects of various essential oils including that of Thymus vulgaris against Malassezia furfur. The activity was evaluated by measuring the inhibition –zone diameter which was observed after 48 hours of incubation. The result showed positive effects of essential oils from Thymus vulgaris [29].
5. Lee et al evaluated Antifungal activity of Plant essential oils against Malassezia furfur. The scientists analysed the antifungal effects of various essential oils including that of Thymus vulgaris against Malassezia furfur. The activity was evaluated by measuring the inhibition –zone diameter which was observed after 48 hours of incubation. The result showed positive effects of essential oils from Thymus vulgaris [30].
6. Radwan et al did a comparative study between topically applied irradiated human amniotic membranes in combination with tea tree oil versus topical ticonazole in Pityraisis versicolor treatment. Tea tree oil has a potent antifungal activity. The clinical trials performrd by the team of scientists aimed to achieve an alternative

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therapeutic treatment able to kill Malassezia and heal PV lesions using Tea tree oil saturated human amniotic membrane. Microbiological evaluation of in-vitro fungicidal activity of Tea tree oil saturated human amniotic membrane versus Tioconazole was carried out against Malassezia furfur culture. This study proved the superior activity of TOSHAM to heal PV lesions than Tioconazole [31].

7. Surabhi et al studied the effect of Tea Tree oil from Melaleuca alternifolia on Malassezia furfur. Tea tree oil which was diluted in DMSO with concen. 10µg/ml, 100µgml and 200µg/ml and its activities were observed by Agar well diffusion method. MIC was observed and Tea tree oil showed inhibition at 100µg/ml [32].
8. Vittorio et al analysed the composition of essential oils present in Thymus vulgaris by GC and GC-MS. The components of essential oils were evaluated against Malassezia furfur. MICs were measured ant it was found that the essential had a potential antimicrobial activity against Malassezia furfur [33].
9. A Wesler et al evaluated the Antifungal effect of Australian tea tree oil on Malessezia pachydermatis isolated from canines suffering from cutaneous skin disease. The team tested Tea Tree oil and Terbinafine-HCL for Antifungal activity against Malassezia sp. Modified broth microdilution method was used to determine MIC and MFC (Minimum Fungicidal Concentration). The yeast was cultured and tested in sabouraud broth medium. The fungicidal activity of Tea Tree oil and Terbinafine-HCL was prominent and was comparable to each other [34].

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