

Essential Oils: Antifungal properties



Cutaneous mycoses are classified into three groups:

DERMATOPHYTOSIS/TINEAS

Caused by **Dermatophyte** fungi:

Athlete's foot: Tinea Pedis

The most common kind of dermatophytosis. It is located in the interdigital folds and soles of the feet. It is common in young adult athletes, especially in summer, as they wear occlusive footwear and often walk barefoot in public locker rooms. It is characterized by causing an unpleasant odor in the feet, itching and a burning sensation. (2)

Onychomycosis: Ringworm of the nails

It affects the nail structure of the hands and / or feet. It is the most common cause of nail disease in developed countries. The incidence of onychomycosis has increased in recent years due to the extensive use of occlusive clothing and shoes, especially sports shoes. The affected person usually feels discomfort, itching and a progressive aesthetic change in the state of their nails. (3)

Summer season: the prevalence of mycoses increases

Mycoses are infectious diseases caused by microscopic fungi. Fungal skin infections are benign pathologies that occur in almost all groups of population. These can be classified into: systemic mycoses, opportunistic mycoses, and superficial mycoses. The last one affects the skin and mucous membranes.

Heat, humidity, deficient hygiene, maceration due to sweat and the use of showers, changing rooms and public swimming pools make summer the period in which the transmission of these diseases is facilitated and there is a higher incidence of this type of mycosis. (1)

CANDIDIASIS

From the genus *Candida*, ***C. albicans*** is the most common causal agent of candidiasis. It belongs to the gastrointestinal, vaginal, oropharyngeal microbiota, periorificial skin and some skin folds. One of the most frequent presentations of the disease in summer is vaginal candidiasis. This is because heat, humidity, the use of bathing suits and tight or occlusive clothing create very favorable circumstances for its appearance.

(4)

PITYRIASIS VERSICOLOR

It is produced by ***Malassezia spp.***, a kind of fungi within the skin microbiome that has a worldwide distribution. Triggers are considered to be: humidity, high temperatures, excessive sweating, the use of sunscreens or creams with a high fat content. With these predisposing conditions, the fungus acquires pathogenic properties. It can occur at any age, but it is more common in teenagers and young adults during the summer. This fungus affects the thorax and proximal areas of the neck and extremities. (4)



Antifungal Properties of Essential Oils

At the moment, there are available various antifungal agents obtained from plants, tested both *in vitro* and *in vivo*, with good fungicidal results against the fungi that frequently appear during the summer season.

In particular, it is worth highlighting the beneficial effects of essential oils extracted from the plants of the Tea Tree, Thyme, Cinnamon and Cloves.

From the distillation of the leaves of the plant *Melaleuca alternifolia* it is obtained the essential oil called **Tea Tree**. This is a phytopharmaceutical that has shown **antifungal activity** due to the direct action of its active components, terpinen-4-ol and 1,8-cineole, against the structures of cell membranes, not only in fungi but also in bacteria.

This oil is used to treat fungal skin infections from Candida and Malassezia, and to treat onychomycosis caused by dermatophytes. According to various studies, the topical application of the oil has not described any adverse reactions. (5)

The **antifungal effect** of other essential oils was investigated in fungal mycelial growth inhibition bioassays.

The results of the study concluded that the following essential oils, **Thyme** (*Thymus vulgaris*), **Cinnamon** (*Cinnamomum zeylanicum*) and **Clove** (*Syzygium aromaticum*), significantly decreased the mycelial growth of the fungi studied.

The growth was 0-36 mm in colony diameter compared to the control (50 mm). The antifungal activity of these essential oils is associated with their monoterpenic phenols such as: Thymol, Carvacrol, Aldehyde, Cinnamic and Geraniol. (6)

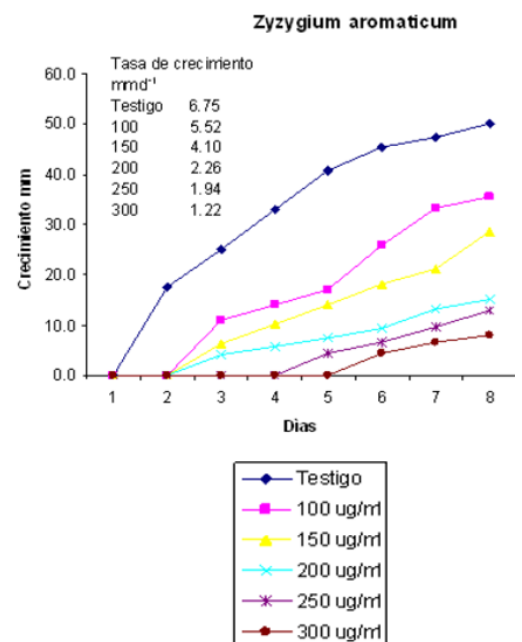
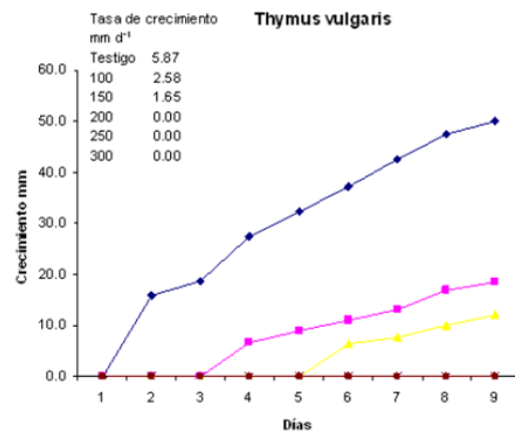
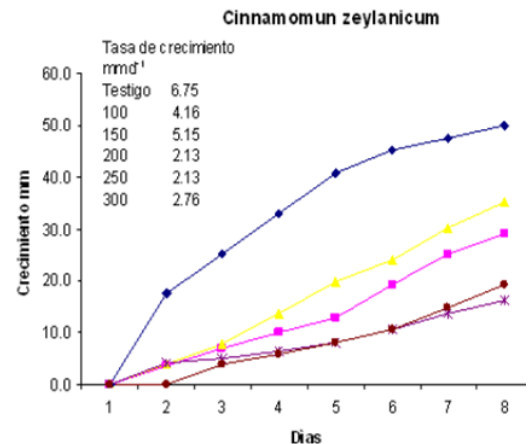


Figure 1. Fungistatic effect of *C. zeylanicum* (Cinnamon), *T. vulgaris* (Thyme) and *Z. aromaticum* (Clove) against mycelial growth (mm). (6)

Therefore, we can conclude that the previously mentioned **essential oils** have demonstrated their **antifungal activity** due to the fact that they participate in the destruction of fungal cells by damaging their cell membrane.

THEIR MAIN ADVANTAGES ARE:



- ★ They do NOT harm the **intestinal** and **vaginal flora**.
- ★ They stimulate the **immune system** so they prevent relapses.
- ★ They do NOT present **resistance** or **toxicity** phenomena at recommended doses.

It should be noted that essential oils are highly concentrated mixtures of vegetable raw materials, obtained directly by distillation of plants.

For this reason, the **direct application** (without dissolving) of an essential oil on the body is **not recommended**, because it can cause skin irritations.

Essential oils are usually diluted in vegetable oils or alcohols before application.

Other essential oils that have shown antifungal activity are:
Essential oils extracted from the plants of **Lavender**, **Oregano**, **Lemon** and **Garlic**.

References

- (1) Havlickova, Czaika, V.A., Friedrich, M. (2008) *Epidemiological trends in skin mycoses worldwide*. *Mycoses*, 51. pp.2-15.
- (2) Nistal, B., Del Pozo, J. (2012) *Dermatofitosis o tiñas*. *Fisterra*.
- (3) Dalmaya, J., Roéa, E., Corellaa, X., García-Navarro, L. (2006) *Onicomycosis*. *Servicio de Dermatología. Hospital de la Santa Creu i Sant Pau. Barcelona*. Vol. 20. Núm. 10. páginas 62-66.
- (4) H. Walter Gubelin, C. Rodrigo de la Parra, F. Laura Giesen. (2011) *Micosis superficiales*. *Tema central: Dermatología*. Vol. 22. Núm. 6. páginas 804-812.
- (5) Mesa, A.C., Bueno, J. G., Betancur, L.A. (2004) *Productos Naturales con Actividad Antimicótica*. *Rev Esp Quimioterap. Prous Science, S.A. - Sociedad Española de Quimioterapia*. Vol.17 (N.4): 325-331.
- (6) Barrera, L., García, L. J. (2008) *Actividad antifúngica de aceites esenciales y sus compuestos sobre el crecimiento de Fusarium sp. aislado de Papaya*. *Revista UDO Agrícola* 8 (1) 33-41.

Farma- Química Sur SL

C/ Carlo Goldoni, 32 Polígono Industrial Guadalhorce
– Málaga 29004 España · Teléfono: 952 240 988 ·
Fax: 952 242 585 · e-Mail:
farmaquimicasur@farmaquimicasur.com