

## Comparative Study in the Treatment of *Candida* and *Aspergillus* with Natural Substances

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### Abstract

The study analyzes the action of some substances from selected plants, on two mycelial species, aiming at the selection of some natural substances, for the treatment of mycoses such as Candidiasis and Aspergillosis. The most obvious fungicidal results were noticed after the application of marigold and propolis tinctures as well as sage and mint oils. The results of the study can be applied as an alternative in the fight against fungal infections, performed by the usual drug treatment.

**Keywords:** *Candida*, *Aspergillus*, mycoses, propolis tinctures, mint oils, fungal infections

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### Introduction

The increased incidence of invasive fungal infections is a constant of human pathology in the last two decades. Infections caused by various species belonging to the genus *Candida* have the rank of nosocomial, serious opportunistic infections, characterized by an accentuated morbidity associated with the hospital environment, translated by prolonging the hospitalization period of patients and increasing the consumption of systemic antifungals [1].

Opportunistic fungi (*Aspergillus*, *Candida*, etc.) are able to cause infections only under certain conditions that involve a state of immunosuppression or rupture of the body's defense barriers [2]. The most commonly involved in human pathology is *Candida albicans* [3].

## Material and Methods

To determine the action of substances extracted from plants on mycelial cultures, we performed experimental studies using plant extracts (oils and tinctures).

### Experiment I

#### The action of substances extracted from plants on *Candida Albicans* crops

The substances subjected to the experimental study were applied on culture plates sown on Saboraud medium, with *Candida Albicans*.



**Fig. 1.** Culture plates sown on Saboraud medium, with *Candida albicans*.



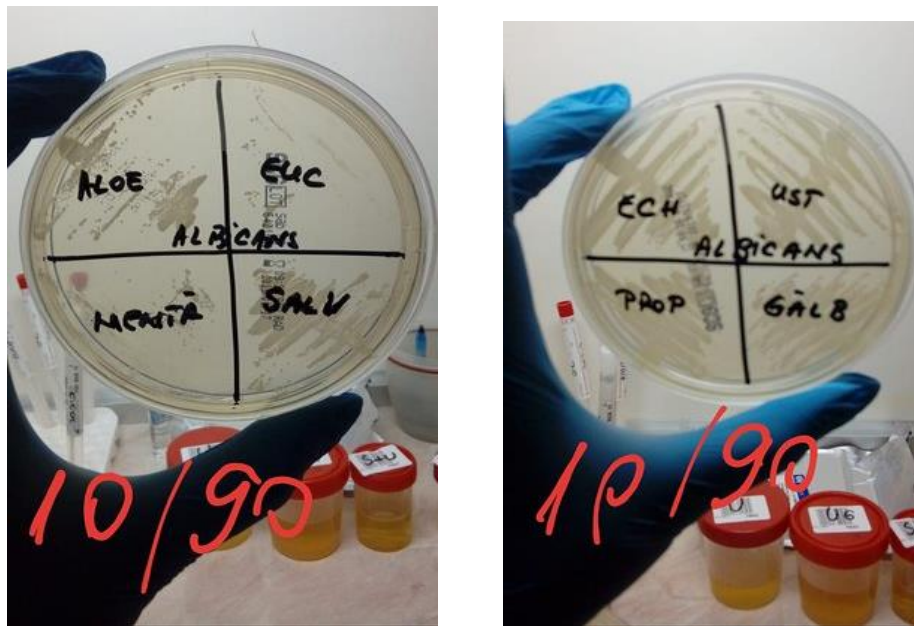
**Fig. 2.** Culture specimens sown on Saboraud medium, with *Candida albicans*.

1. We made dilutions of 100  $\mu$ l substance (oil) / 900  $\mu$ l saline for:

- a. Oils: Aloe, eucalyptus, sage, mint
- b. Tinctures: Echinacea, garlic, propolis, marigold

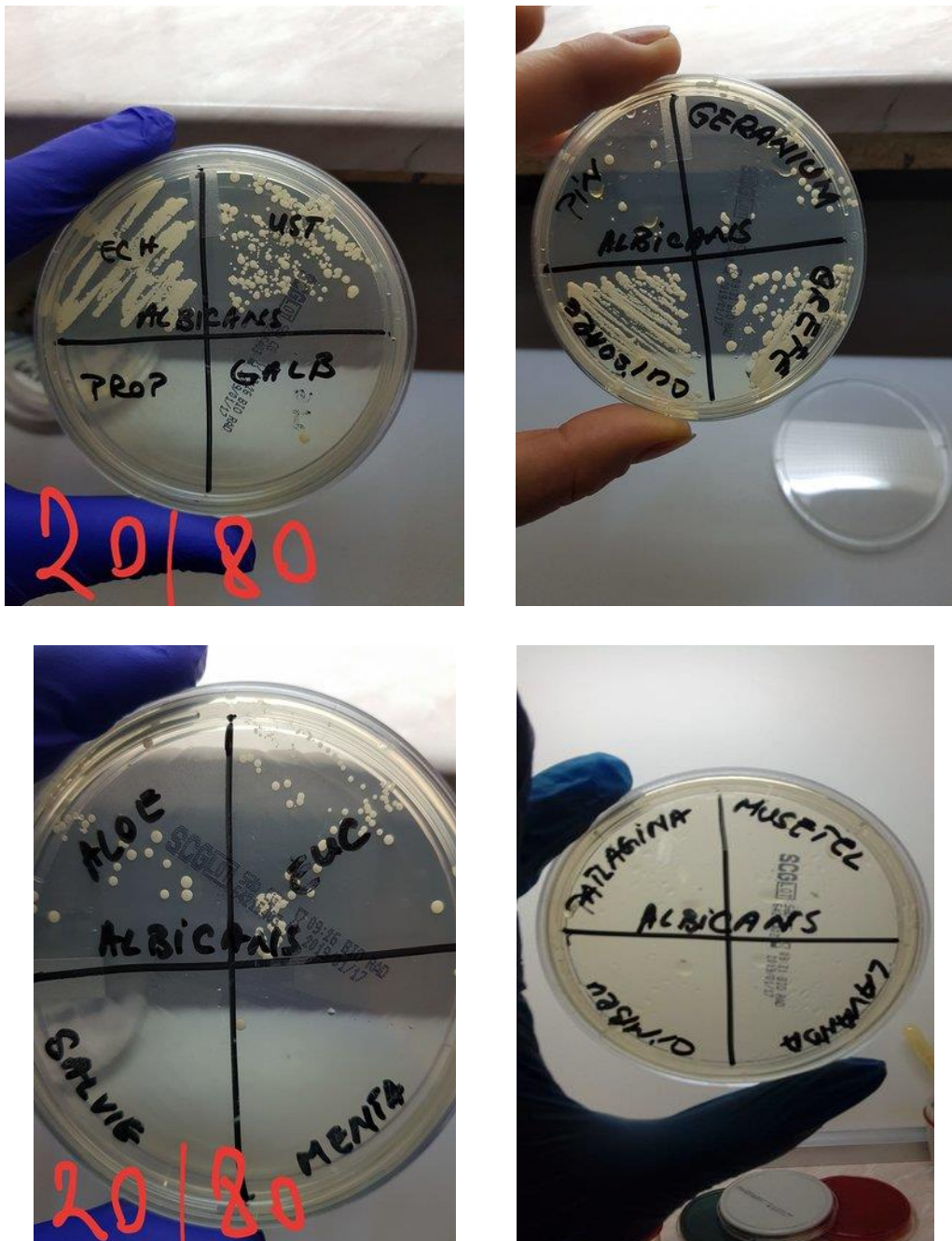
The substances were applied to *Candida* / and *Aspergillus* ear mold cultures (taken from the auricles). The plates were thermostated at 37°C for 24 hours [4].

When we applied these substances to crops for the treatment of *Candida albicans*, with these substances and under these conditions, no changes were found.



**Fig. 3.** Crop plates sown with *Candida Albicans* on which oils of: Aloe, eucalyptus, sage, mint and echinacea tinctures, garlic, propolis, marigolds in a concentration of 10% were applied.

We repeated the experiment with dilutions: 200  $\mu$ l substance / 800  $\mu$ l saline. I also added pine, geranium, cloves, graft kernel oils, as well as plantain and chamomile tinctures.



**Fig. 4.** Crop plates sown with *Candida albicans* on which sage, aloe, eucalyptus, mint, pine, geranium, cloves, graft seeds, thyme, lavender and echinacea tinctures, garlic, propolis, marigold, plantain were applied , chamomile in 20% concentration.

After 24 hours the following were observed:

- For plates where solutions in a concentration of 10% were not applied no action was noticed.

- Sensitivity to plates where solutions have been applied in a concentration of 20%.

Dilutions of 200 µl substance / 800 µl saline for:

- pine and geranium oil determined partial destruction (about 70%) of mycelial colonies;

- graft seed and clove oil did not change;

- the (essential) oils of lavender, sage, mint and thyme caused the total destruction of mycelial colonies.

- Plantain tincture, chamomile, marigold and propolis caused the total destruction of mycelial colonies as well.

*Candida* is sensitive to plantain, chamomile, marigold, propolis (tinctures) and thyme, lavender, sage and mint (oils).

## Experiment II

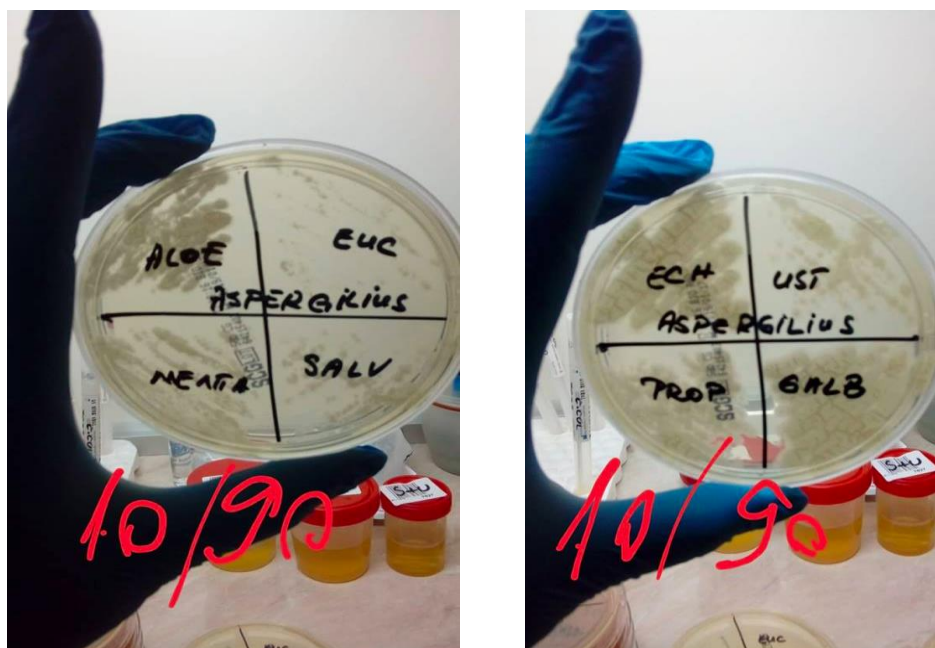
### The action of substances extracted from plants on crops of *Aspergillus*

In order to highlight the action of some substances extracted from plants on *Aspergillus* cultures, we took samples from a person who had cellular detritus with *Aspergillus* (in the auricles), after which we mixed them with certain dilutions of essential oils or tinctures and I applied on Petri dishes with Sabouraud culture medium. I put these plates in a thermostat at 37 °C for 24 hours.



**Fig. 5.** Plates sown with *Aspergillus*

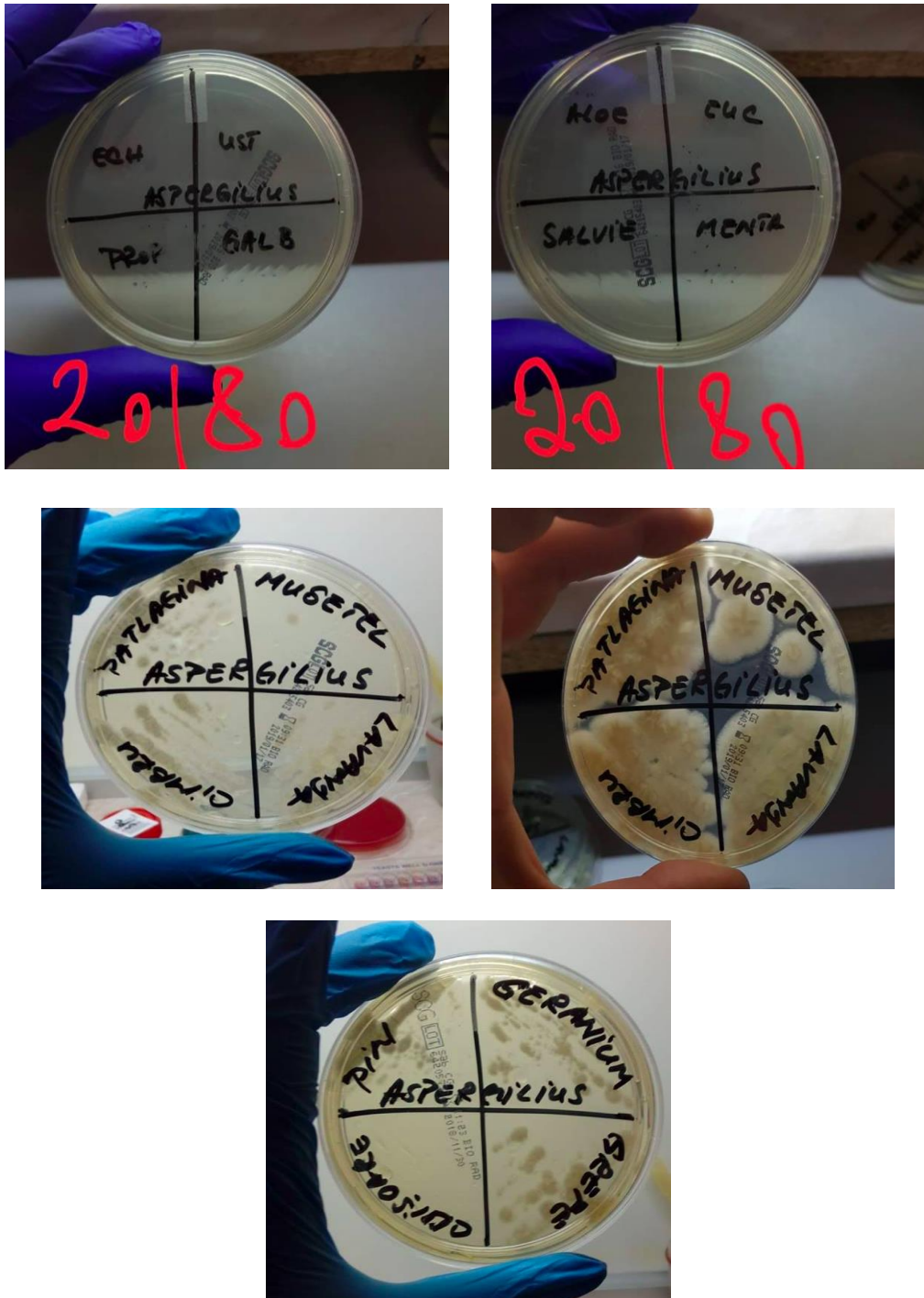
1. We used the following substances:  
aloe, eucalyptus, sage, peppermint -oil  
echinacea, garlic, propolis, marigold - tincture  
We made dilutions of 100  $\mu$ l substance (oil) / 900  $\mu$ l saline.



**Fig. 6.** *Aspergillus* seeded plates to which oils or tinctures in a concentration of 10% were applied

When applying these substances to crops for the treatment of *Aspergillus*, no changes were found.

2. Dilutions of 200  $\mu$ l substance / 800  $\mu$ l saline for previously used substances, to which we have added other substances, meaning:
  - oils: pine, geranium, cloves, grafts (seeds), Aloe, eucalyptus, sage, mint;
  - tinctures: thyme, lavender, plantain, chamomile, echinacea, garlic, propolis, marigold applied on culture media.



**Fig. 7.** *Aspergillus* seeded plates to which oils or tinctures in a concentration of 20%

Were applied Eucalyptus oil, Aloe, sage, mint, cloves, as well as tinctures of garlic, propolis, marigold and echinacea demonstrated after 24 hour incubation the fungicidal action in the proportion of 100/100 on *Aspergillus* colonies.

### **Discutions**

After this period we found that in the case of some oils (more precisely those of cloves, aloe, sage, eucalyptus and echinacea), as well as in the case of some tinctures for example propolis tincture, chamomile, garlic and marigold among those proposed in the study that appears a sensitivity, which means that we can treat *Aspergillus* naturally. *Aspergillus* is sensitive to dilutions of 200  $\mu$ l substance / 800  $\mu$ l saline for eucalyptus oil, sage, mint, echinacea and tincture of garlic, marigold and propolis in 24 hours.

### **Conclusions**

The results of the two experiments show that in the therapy of cutaneous and mucosal mycoses can be recommended the local application of products extracted from plants, marketed in the form of oils or tinctures. The recommended products are:

- marigold and propolis tinctures;
- sage and mint oils.

The recommended concentration is 20%, in daily applications, until complete healing.

### **References**

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