

# MEDICAL SCIENCES

## STUDY WITH 15 NATURAL SUBSTANCES AND COLLOIDAL PLATINUM SOLUTION ON CANDIDA ALBICANS

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### Abstract

In the present study, we proposed the treatment of candida with several natural products such as: tinctures of: horsetail, burdock, artichoke, rosehip, mouse tail, hot pepper, oils: white sea buckthorn oil for internal use (*Hippophae rhamnoides*), cold-pressed mustard oil, Biomicin forte A 15 - natural essential oils (product composed of sunflower oil, thyme essential oil - *Thymi aetheroleum*, clove essential oil - *Caryophylli floris aetheroleum*) and BIOSEPT A 13 - medicinal plant syrup with honey, vitamin C and propolis, chokeberry juice (at a concentration of 15%, lemon juice, grape pulp juice at least 20%), turmeric & pepper (pills from PRONATURAL) and colloidal solution of Pt.

**Keywords:** *Candida albicans*, *Candida* spp, culture medium, gentian violet, essential oil, tincture, culture plates.

**Abbreviations:** Pt – platinum, SF – saline, ATCC – *Candida albicans* standard culture, h – hour, µL – micro-litres, mg – milligrams

### INTRODUCTION

The decrease in the isolation of *Candida albicans* species and the increase in the incidence of fungi with non-albicans species (*C.glabrata*, *C. parapsilosis*, *C.krusei*) represents a worldwide trend. Thus, the pattern of resistance to antifungals is particular, different from that of *Candida albicans* strains, in general, more sensitive (1). Yeasts and fungi present in the environment can enter the human body through inhalation, ingestion and post-traumatic skin inoculation, initiating infections located in the lungs, skin tissue, paranasal sinuses. Some community mycoses can cause life-threatening infections, especially in immunocompromised patients (2).

The most prevalent dermatophytes are mainly those of the genera - *Trichophyton*, *Microsporum* and *Epidermophyton* (3), classified as anthropophilic, zoophilic and geophilic according to their primary habitat (4), (5).

Candidiasis is caused by yeasts of the *Candida* genus, especially *Candida albicans* (6).

At candidiasis the first step is the elimination of predisposing factors. Gentian violet diluted in 1:10.000 aqueous solution, 10% alcohol, can be used for oropharyngeal manifestations; and potassium permanganate solutions of 1/3.000 to 1/5.000. The best therapeutic for all forms is nystatin but it is not very effective when administered orally, unless it is for gastrointestinal forms, as the medicine is not absorbed in the intestine. The oral dose can reach up to 1,500,000 daily units, distributed in 3 or 4 doses. To treat vaginitis, nystatin can be used in the form of vaginal cream, as well as vaginal imidazole creams (7), (8), (9), (10), (11).

### MATERIAL AND METHOD

The study took place at the analysis laboratory of the "Provita 2000 Medical Center" Clinic in Constanta between August 22 and August 27, 2022 during 5 days; we searched for natural substances and combinations of substances supposed to have an antifungal action on *Candida albicans* during the proposed study. In this sense we used oils: white sea buckthorn oil for internal use (*Hippophae rhamnoides*), cold-pressed mustard oil, Biomicin forte A 15 - natural essential oils (product composed of sunflower oil, thyme essential oil - *Thymi aetheroleum*, essential oil of cloves - *Caryophylli floris aetheroleum*) and tinctures of: horsetail, burdock, artichoke, horsetail, mouse tail, hot pepper, juice, certain products such as syrup - BIOSEPT A 13 - syrup from medicinal plants with honey, vitamin C and propolis, chokeberry juice (15% concentration, lemon juice, grape pulp juice minimum 20%), capsules of 100% natural substances - turmeric 250 & pepper (pills from PRONATURAL) and colloidal solution of Pt. To highlight the action of natural products on *Candida albicans* cultures, we used Sabouraud's standard culture medium on which we seeded samples of *Candida albicans*, from a calibrated assortment, called ATCC 60193. We introduced the plates to the thermostat, at the standard temperature of 37 °C (12), (13), (14). Later, for the natural substances that inhibited candida, I took some fragments/parts of the colony from the plates to be examined under the optical microscope. For coloring I used gentian violet 3%. They were fixed with a flame and then washed with tap water.

**Staining method**

- A smear is made, that is, the biological material is spread in a very thin layer on a glass slide;
- It is fixed in a weak flame (sometimes with methyl alcohol);
- Coloring begins;
- The smear made on the slide from the pathological product and then fixed to the flame is covered with the 3% gentian violet solution (the same is done for the 3% methylene blue solution);
- Then wash with tap water
- After drying, examine under a microscope (15).

**RESULTS AND DISCUSSIONS****5-day experiment**

In the first phase of the experiment I prepared the necessary substances; we dissolved the turmeric & pepper pill in SF, the BIOMYCIN FORTE A15 capsule (soft capsule) was prepared for the study and the sea buckthorn oil was dissolved in SF; I cut the capsule; one capsule of Biomycin forte A15 contains 250 mg of oils; I crushed/crushed the turmeric & pepper pill (which weighs 250 mg). The tinctures were used in their normal state. Also, chokeberry juice and colloidal platinum solution were used in their existing state. Later I added a few colonies of *Candida* spp. (about 2-3).



(a)

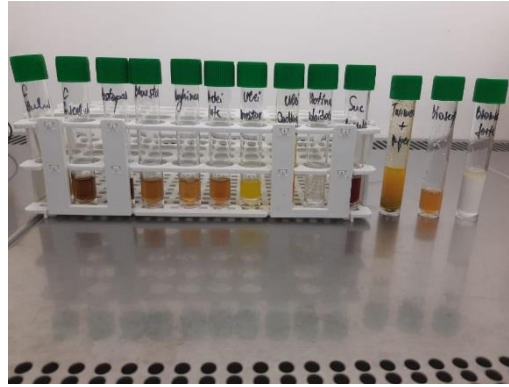


(b)

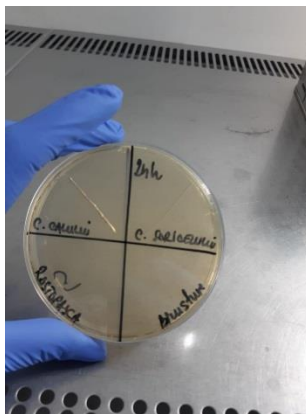


(c)

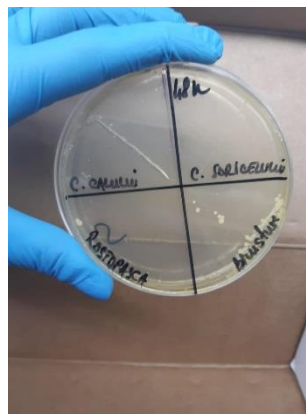
**Figure 1** Products used in the study: turmeric 250 & pepper and chokeberry juice (a), Biosept A 13 -syrup (b), colloidal platinum solution (c) We made readings and interpretations at 24 h, 48 h, 72 h, 96 h and 120 h.



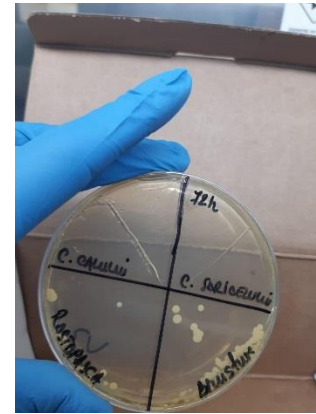
**Figure 2** Culture tubes seeded on Sabouraud medium with *Candida albicans* a. I used tinctures of: horsetail (from Dacia Plant), mouse tail (produced by Hofigal), celandine and burdock (from Dacia Plant)



(a)



(b)



(c)



(d)



(e)

**Figure 3 (a, b, c, d, e)** Culture plates inoculated with *Candida albicans* on which different tinctures (of horsetail, mouse tail, yarrow and burdock) were applied at 24 h, 48 h, 72 h, 96 h and 120 h

After 24 h from seeding, the tinctures of: horse tail and mouse tail had antifungal action in the treatment of candida, in contrast to the tinctures of horsetail and burdock. 48 h after sowing, the result was the same. For the substances with an inhibitory effect, we made colored slides at 48 h, 72 h, 96 h and 120 h after seeding, which we put under the optical microscope with an immersion objective / clarity x100 for in-depth visualization. Staining was done with gentian violet 3%.

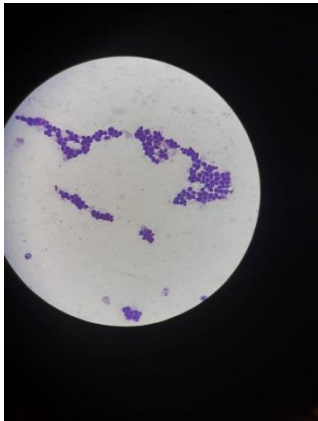
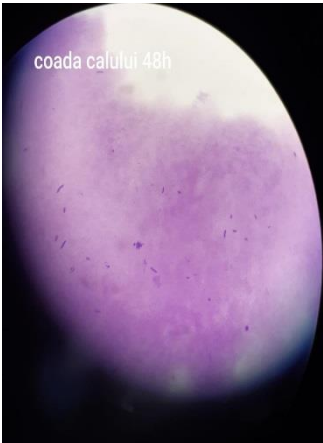
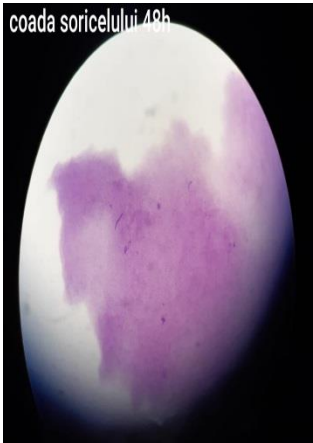


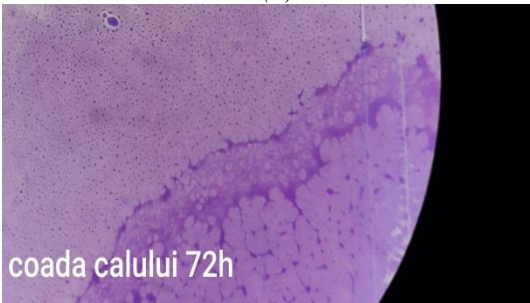
Figure 4 Candida with gentian violet



(a)



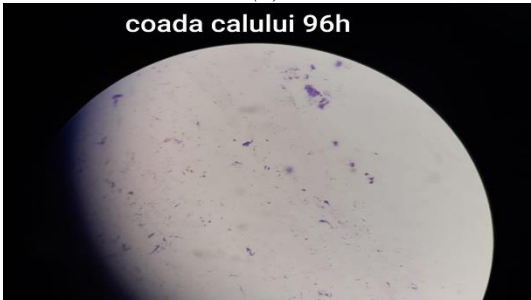
(b)



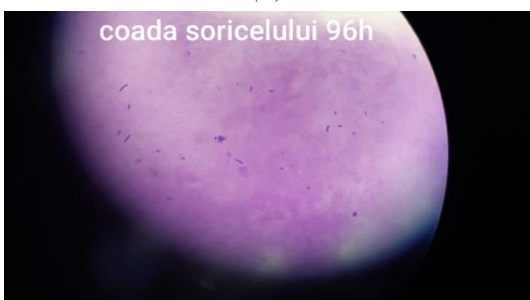
(c)



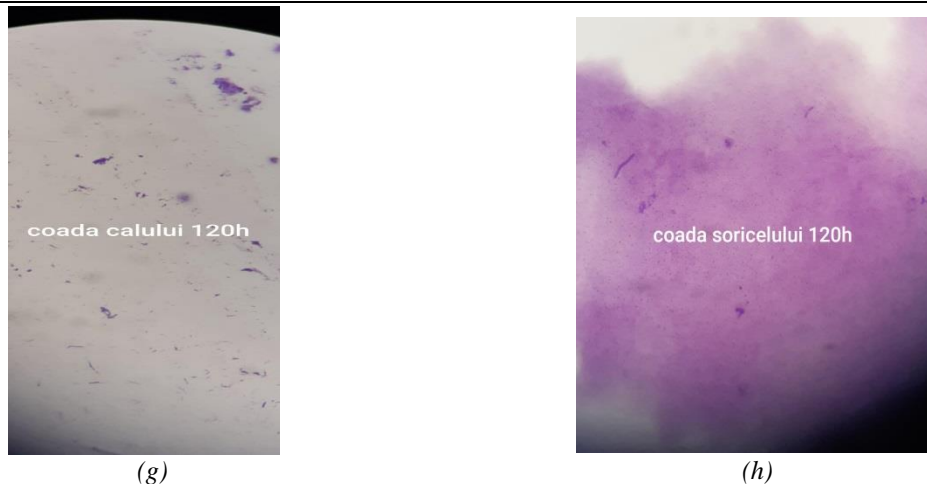
(d)



(e)



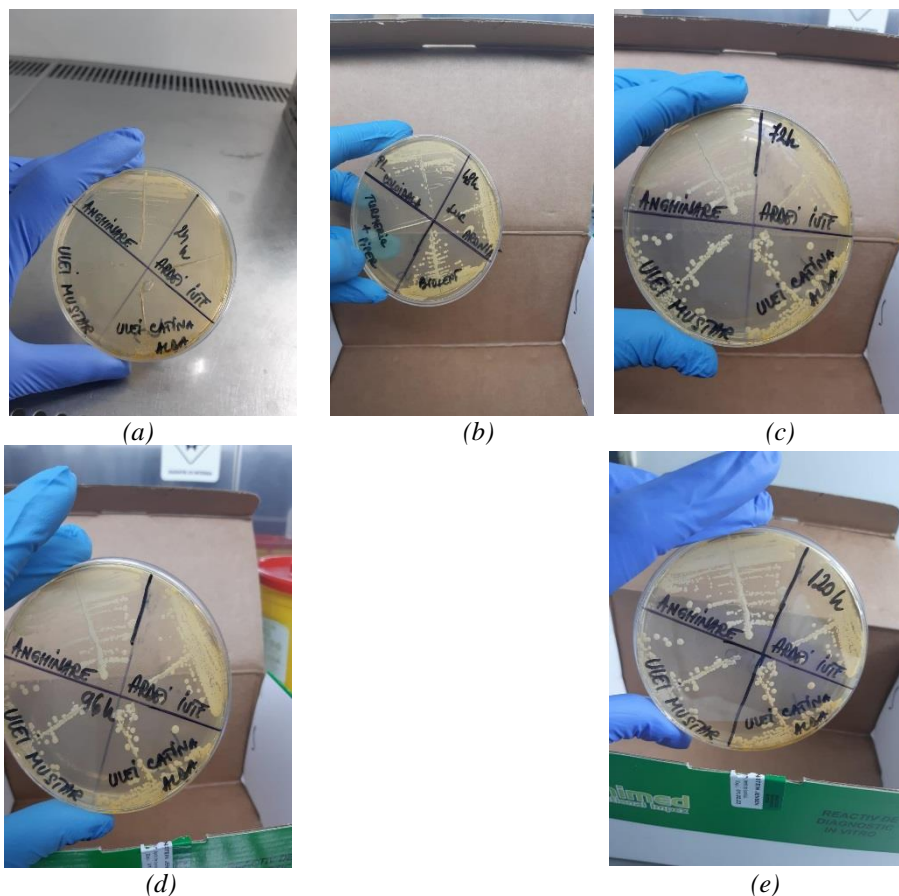
(f)



**Figure 5 (a, b, c, d, e, f, g, h)** Mycelial cultures on which we put horsetail and mousetail tinctures after thermostating for 48 h (a, b), 72 h (c, d), 96 h (e, f) and 120 h (g, h) examined under an optical microscope with a x100 objective

During the 5 days of the study, the two tinctures of: horsetail (from Dacia Plant) and mousetail (produced by Hofigal) maintained their antifungal capacity against *Candida albicans*, and the tinctures of: and burdock showed no inhibitory effect during this period. The microscopic appearance of *Candida* cultures was slightly different for the substances in the study: tincture of mouse tail and tincture of horse tail; we visualized filaments characteristic of *Candida albicans* and a

mycelial shrinkage in these cases. b. I used tinctures of: artichoke (from Dacia Plant) and hot peppers (*Capsicum annuum*, fruit, 10% - from Faunus Plant), cold-pressed mustard oil (from Herba Sana) and sea buckthorn oil (produced by Hypericum Impex S.R.L.), 100% natural product. For the two oils, we achieved a concentration of 30% by dissolving 300  $\mu$ l substance /700  $\mu$ l SF.

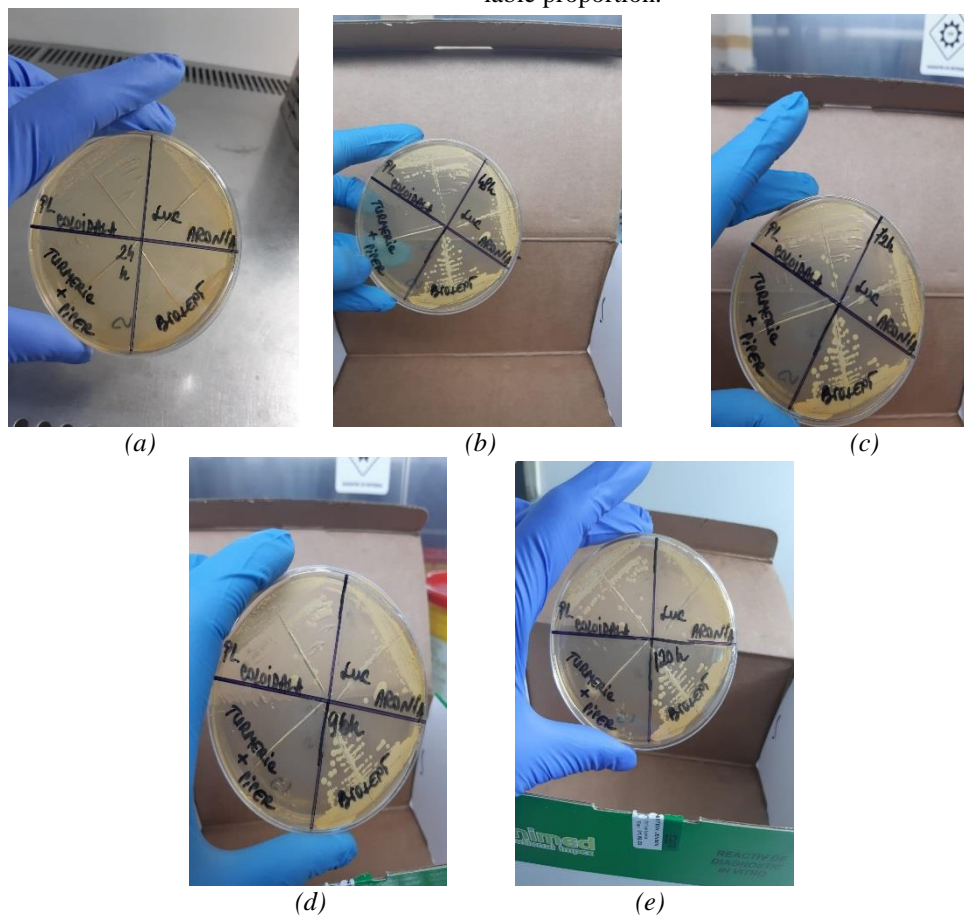


**Figure 6 (a, b, c, d, e)** Culture plates seeded with *Candida albicans* that were applied with mustard and sea buckthorn oils at a concentration of 30% and tinctures of: artichoke and hot pepper at 24 h (a), 48 h (b), 72 h (c), 96 h (d) and 120 h (e)

24 h after seeding, the hot pepper tincture had an antifungal effect. 48 hours after sowing, all 4 substances: tinctures (artichoke and hot pepper), mustard oil and sea buckthorn oil have no antifungal action. Also, at 72 h, 96 h and 120 h, the 4 substances cannot destroy *Candida albicans*. For the hot pepper tincture, I did not make any more colored slides because candida reappeared 48 hours after sowing.

c. Colloidal platinum solution, chokeberry juice, turmeric & pepper 250 (pills) - product from PRO NATURAL and the product BIOSEPT A13 – syrup. The chokeberry juice is actually a combination of chokeberry juice 15%, lemon juice, grape pulp juice minimum 20%; it was used directly from the bottle, as was the colloidal platinum solution (produced by Aqua Nano 480ml, 10 ppm). I obtained the solution of TURMERIC 250 & PIPER by dissolving a pill from

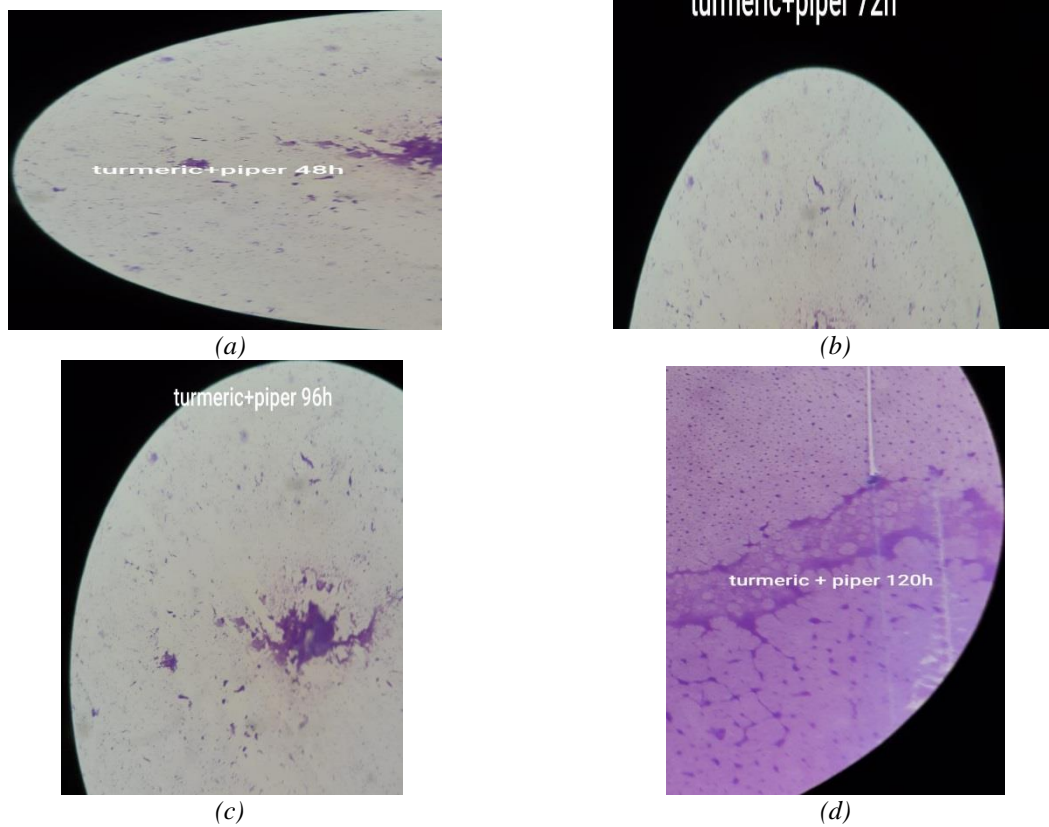
this product, i.e. Turmeric/Turmeric root powder (*Curcuma longa*) 200 mg & black pepper fruit powder – *Piper nigrum* 50 mg; thus, I dissolved the powder from a pill in 4 ml of saline. BIOSEPT-A 13 syrup with honey, vitamin C and propolis from Fares was used in its existing state; it consists of several substances, such as: minimum 64% bee honey, aqueous extracts of: echinacea (*Echinacea herba*), thyme (*Serpylli herba*), sorghum (*Origan Herba*), stone lichen (*Lichen Islandicus*), cinnamon (*Cinnamomi cortex*), ginger rhizomes (*Zingiberis rhizoma*), olive leaves (*Oleae folium*), cloves (*Caryophylli flos*), dry extract of *Astragalus membranaceus* – min. 35%, propolis hydroglyceric extract 1.2%; vitamin C 1%; essential oils of: geranium (*Pelargoni aetheroleum*), lemon (*Citri aetheroleum*), cinnamon (*Cinnamomi aetheroleum*), evening primrose (*Melissae aetheroleum*) - minimum 0.045% in variable proportion.



**Figure 7(a, b, c, d, e)** Culture plates seeded with *Candida albicans* on which chokeberry juice, the product BIOSEPT A13 – syrup was applied. turmeric & pepper lozenge (dissolved in SF) as well as colloidal platinum solution at 24 h (a), 48 h (b), 72 h (c), 96 h (d) and 120 h (e)

During the 5 days study only the product turmeric 250 & pepper inhibited the growth of the *Candida albicans* culture from the first day compared to the colloidal solution of Pt, chokeberry juice and the product BIOSEPT A13 – syrup with honey, vitamin C and

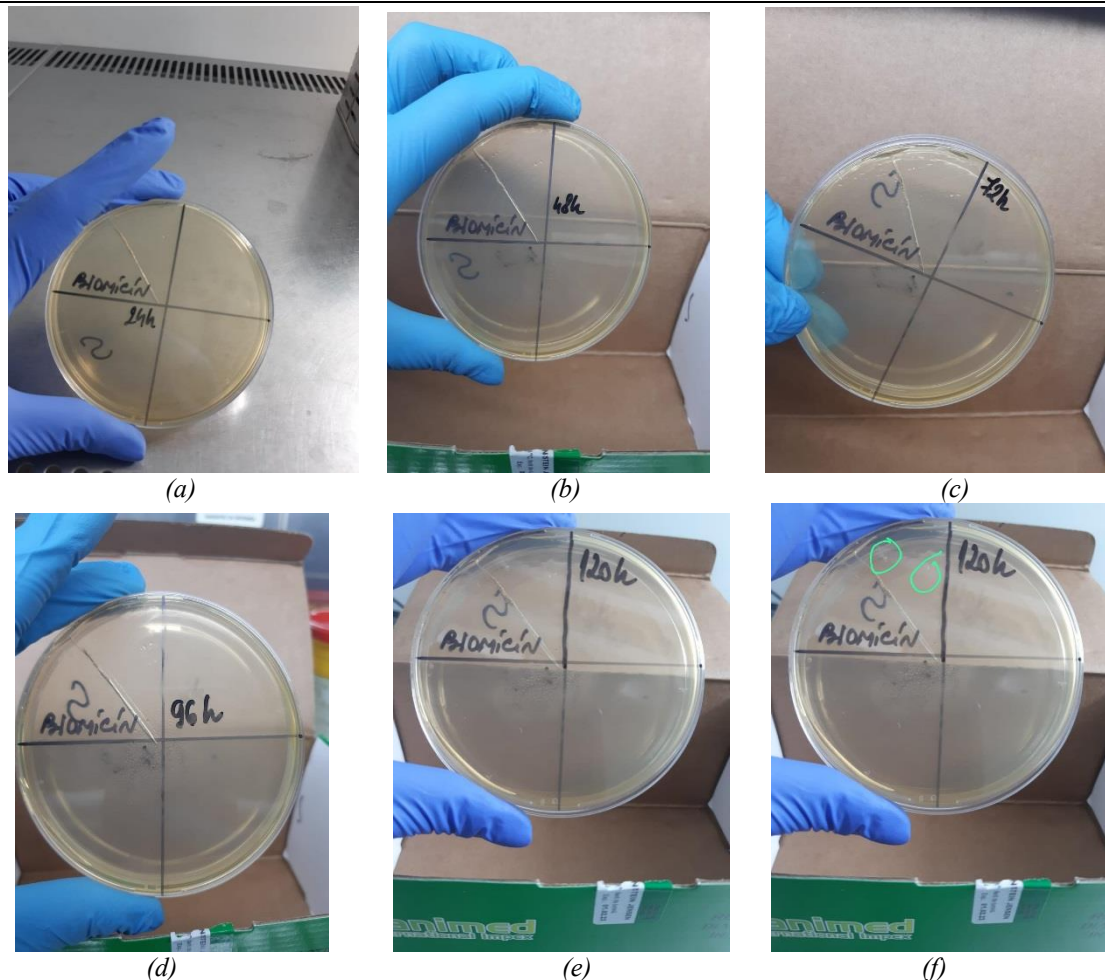
propolis from Fares and maintained this capacity until finally. We made slides for the optical microscope in the case of the product with turmeric 250 & pepper at 48 h, 72 h and 120 h.



**Figure 8 (a, b, c, d)** Mycelial cultures on which we applied the turmeric 250 & pepper pill (dissolved in SF) after thermostating for 48 h (a), 72 h (b), 96 h (c) and 120 h (d) examined under the optical microscope with objective x 100

For the product with turmeric & pepper we noticed a decrease in the mycelia under the optical microscope. d. BIOMYCIN FORTE A15, produced by Fares, which is available in the form of capsules; it consists of sunflower oils, thyme essential oil - Thymi aetheroleum,

clove essential oil - Caryophylli floris aetheroleum. The product was used as such; I cut the capsule with oils, than added 3 colonies of *Candida albicans*.



**Figure 9 (a, b, c, d, e, f)** Culture plates seeded with *Candida albicans* on which we applied the product BIOMYCIN FORTE A15 (capsule dissolved in SF) at 24 h (a), 48 h (b), 72 h (c), 96 h (d) and 120 h (e, f)

From the first 24 h *Candida albicans* increased; 2-3 colonies appeared on the plate with BIOMYCIN forte A15. During the 120 h of study, *Candida albicans* grew in the presence of the natural product Biomicin forte A15, which is why we no longer made plates for the optical microscope.

### Conclusions

During the 5 days of the experiment, we found that the tinctures of horsetail (from Dacia Plant) and mouse-tail (produced by Hofigal), unlike the tinctures ofcelandine and burdock (from Dacia Plant) inhibited the development of *Candida Albicans* from the first day to the last day of the experiment. Hot pepper tincture (from Faunus Plant) had an antifungal effect for 24 h compared to artichoke tincture (from Dacia Plant), cold-pressed mustard oil (from Herba Sana) and sea buckthorn oil (produced by Hypericum Impex S.R.L.) 100% natural. For the next 4 days of the experiment, the hot pepper tincture does not inhibit the development of *Candida*. During the 5 days of the experiment, artichoke tincture (from Dacia Plant), cold-pressed mustard oil (from Herba Sana) and sea buckthorn oil (produced by Hypericum Impex S.R.L.) could not stop the development of *Candida albicans*. In the case of hot pepper tincture, we can propose the use of this product several times or in combination with other antifungal substances, possibly, for preventive purposes, we consume hot pepper at the table. Turmeric 250 & pepper

lozenge (product from PRO NATURAL) versus colloidal platinum solution, chokeberry juice (actually a combination of chokeberry juice 15%, lemon juice, grape pulp juice minimum 20%) and the BIOSEPT product A13 – syrup with medicinal plants, honey, vitamin C and propolis from Fares had an antifungal effect during the 120 h of study.

BIOMYCIN FORTE A15, produced by Fares (in the form of capsules and consisting of sunflower oils, essential oil of thyme - *Thymi aetheroleum*, essential oil of cloves - *Caryophylli floris aetheroleum*) has no antifungal action in the treatment of *Candida* for the 120 h of evaluation. Also, on the plates colored with gentian violet and the products that inhibit the development of *Candida* (tinctures of: horsetail (from Dacia Plant) and mouse-tail (produced by Hofigal), as well as turmeric & pepper 250 capsules could be observed under the microscope optical reduction of the number of *Candida* mycelia. In conclusion, the 3 substances under study: tinctures of horse tail (from Dacia Plant), mouse tail (produced by Hofigal Plant) and turmeric 250 & pepper capsules can be used successfully To stop the development of *Candida albicans* and to a lesser extent or, possibly, repeatedly for a lasting effect, we can also use the hot pepper tincture (from Faunus Plant) either separately or in combination with other natural substances known as antifungal.



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