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The Sensibility to Antimycotics of Some *Candida Spp.* Strains Isolated from Humans and Animals

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Abstract. The researches were made during February – June 2011 within the Microbiology Laboratory of the Faculty of Veterinary Medicine Cluj-Napoca. A total number of 16 *Candida spp.* strains isolated from both healthy and diseased animals from different species and humans and 2 ATCC strains, were tested regarding the sensitivity to antimycotics such as: Nystatin, Fluorocytosine, Miconazole, Itraconazole, Amphotericin B and Ketoconazole. For the isolated strains from parrot faeces, Miconazole and Amphotericin B were the most efficient; for dog otitis - Miconazole; for mastitis cow milk - Nystatin; for human tonsillitis – Amphotericin B; for ATCC 90028 – Miconazole and for ATCC 10231 – Amphotericin B. Regarding overall sensibility Miconazole was the most efficient antimycotic for all the strains tested in this study.

Key words: *Candida spp.,* sensitivity, antimycotics, animals.

INTRODUCTION

Fungi are eukaryotic organisms with approximately 300 000 different species. Of these, about 200 are potential parasites, with only a few of these affecting animals (1). Fungal diseases of mammals, mycoses, range from the common mild cutaneous or subcutaneous skin infections, to the potentially lethal acute or chronic infection of deep tissues that are typically caused by *Candida* species. Of the *Candida* species affecting animals, *Candida albicans* is by far the most common. *Candida albicans* belongs to the class Ascomycetes and the family Saccharomycetaceae. This yeast can live as harmless commensal in many different body locations, and is carried in almost half of the population (5). However, in response to a change in the host environment, *Candida* can convert from a benign commensal into a disease-causing pathogen, causing infections in the oral, gastrointestinal, skin and genital tracts (1,).

Yeast resistance to antimycotics is a major problem of the latest decades, candida being the most important pathogenic potential yeast. Synthetic antifungal drugs are used to prevent and treat fungal skin infections, especially in immunocompromised patients such as those with AIDS or those on chemotherapy(3).

Ketoconazole is very lipophilic, which leads to accumulation in fatty tissues. The less toxic and more effective triazole compounds fluconazole and itraconazole have largely replaced ketoconazole for internal use. As an antifungal, ketoconazole is structurally similar to imidazole and interferes with the fungal synthesis of ergosterol, a constituent of fungal cell membranes, as well as certain enzymes. As with all azole antifungal agents, ketoconazole works principally by inhibiting the enzyme cytochrome P450 14-alpha-demethylase (P45014DM). This enzyme participates in the sterol biosynthesis pathway that leads from

lanosterol to ergosterol. Lower doses of fluconazole and itraconazole are required to kill fungi compared to ketoconazole, as they have been found to have a greater affinity for fungal cell membranes(2).

The researches aimed to evaluate "in vitro" the efficiency of different antimycotics on 18 *Candida spp.* strains isolated from both healthy and diseased animals.

MATERIALS AND METHODS

The investigations took place during February – June 2011 within the Microbiology Laboratory of the Faculty of Veterinary Medicine Cluj-Napoca. A total number of 18 *Candida spp.* strains were isolated from both healthy and diseased animals, as well as samples collected from human tonsillitis. The samples collected from diseased animals and their type of lesions were represented by: mastitis cow milk, dogs suffering from otitis, cats and dogs suffering from tonsillitis and parrot faeces. Two control *Candida albicans* strains were also used within the study (ATCC 90028 and ATCC 10231).

72 hours culture of the strains taken into study cultivated on glucose agar and incubated at 37°C was suspended in saline to a density of 0,5 on McFarland scale (150 x 10^6 CFU/ml). Petri dishes of 9 cm diameter containing glucose agar were flooded with the suspension for each strain and the excess removed. After drying the agar surface, standardized antimycotics were placed by the antibiogram model. They were represented by Nystatin (NYSTA), Fluorocytosin (FLU1), Miconazole (MICOZ), Itraconazole (ITC50), Amphotericin (AMB20) and Ketoconazole (Kt). The results were interpreted determining the inhibition area around each micro disc after 48-72 h incubation at 37°C.

RESULTS AND DISCUSSIONS

The results registered for the total number of 18 tested *Candida spp*. strains are presented in table 1.

Tab. 1.

Results (mm inhibition area diameter) of the sensibility to antimycotics for the tested strains

Antimycotic /*Candida* strain	**Nystatin**	**Fluorocytosine**	**Miconazole**	**Itraconazole**	**Amphotericin**	**Ketoconazole**
1-201	20	R	13	R	17	R
28-09	17	R	R	13	12	R
L.A.	19	R	20	R	18	R
L.M.	R	R	R	R	18	R
201/2009	19	R	12	R	18	R
3-197	R	R	23	R	R	R
34-9	17	R	15	R	17	R
31-13	18	R	20	14	18	R
20/2011	18	R	20	R	17	24
33-22	15	R	18	17	18	25
EZV	18	R	19	R	16	R
22-13a	17	R	16	14	18	R
88/2011	R	R	16	R	14	R
MAM	18	R	16	R	17	R
24-9	R	R	22	15	R	R
33-18a	13	R	17	R	16	12
90028	R	R	32	R	R	R
10231	18	R	11	R	20	R

R - resistant

The best sensitivity of the tested strains is registered for Miconazole, followed by Amphotericin, Nystatin and Itraconazole, while the least efficient antimycotic was Fluorocytosine followed by Ketoconazole.

Regarding averages of the inhibition area diameter (in mm) for the strains taken into study, for Miconazole the value is 16.11, for Amphotericin 14.11, for Nystatin 12.61, in case of Itraconazole 4.05, 3.38 for Ketoconazole and o for Fluorocytosine. Chart 1 clearly express the values of average inhibition diameters.

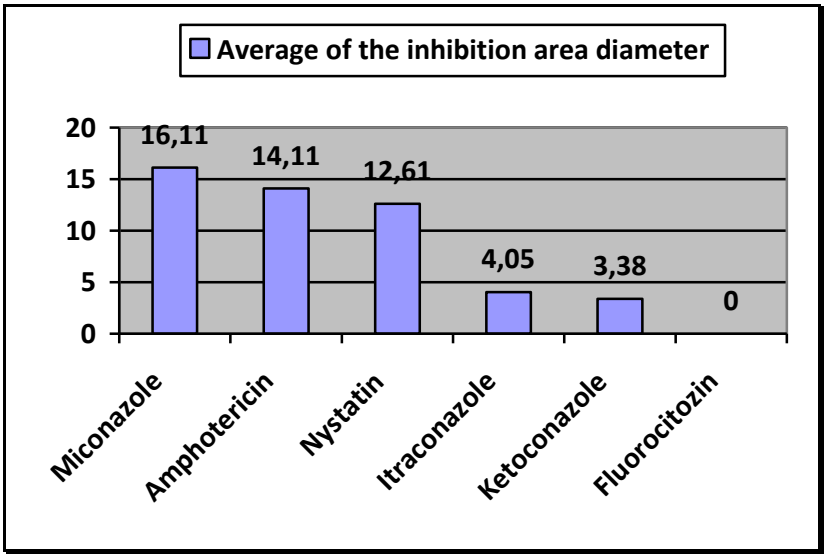

Chart 1. Average of the inhibition area diameter (in mm) for the strains taken into study

Regarding the sensitivity of the strains isolated from parrot faeces, Miconazole and Amphotericin B were the most efficient; for dog otitis - Miconazole; for mastitis cow milk - Nystatin; for human tonsillitis – Amphotericin B; for ATCC 90028 – Miconazole and for ATCC 10231 – Amphotericin B.

The following images are presenting the sensitivity area diameter for a strain collected from mastitis cow milk (left) and parrot faeces (right).

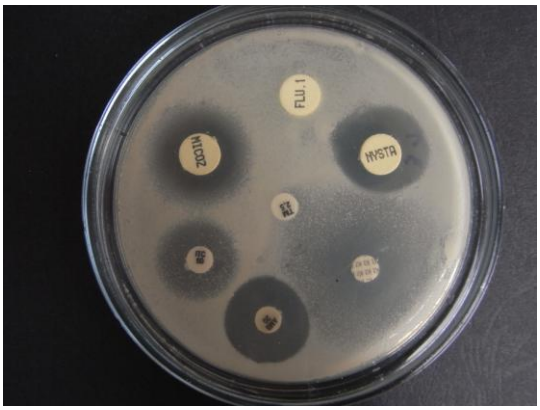

Fig. 1. Sensitivity to antimycotics of a strain isolated from mastitis cow milk

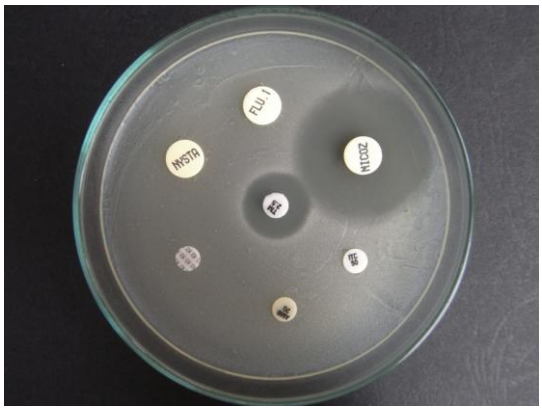

Fig. 2. Sensitivity to antimycotics of a strain isolated from parrot faeces

CONCLUSIONS

- The global sensitivity of *Candida spp*. strains tested is satisfactory observing that for each strain at least one antimycotic can be recommended for the therapy.
- Miconazole was the most efficient antimycotic considering the average of the inhibition area diameters and the sensitivity of each tested strain.
- Fluorocytozin is an antimycotic drug that in case of the strains tested within this study had no efficiency.

ACKNOLEDGMENTS

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