

## *Trichosporon* species isolated from human respiratory system

MARIA DYNOWSKA

Department of Botany, Institute of Biology and Environmental Protection, Pedagogical University,  
Żołnierska 14, 10-561 Olsztyn, Poland

D y n o w s k a M.: *Trichosporon* species isolated from human respiratory system. Acta Mycol. 31 (2): 137-141, 1996.

The research included clinical material collected from the patients of the Specialist Medical Unit for Tubercles, Lung Diseases and Oncology in Olsztyn with particular consideration to the respiratory system and to *Trichosporon* species. In total 3 species were isolated: *Trichosporon beigelia* Vuillemin, *Trichosporon capitatum* Diddens et Lodder and *Trichosporon pullulans* Diddens et Lodder. *T. beigelia* dominated in the material examined.

**Key words:** respiratory system, *Trichosporon*.

### INTRODUCTION

The paper presents a fragment of research on micro-flora of respiratory system with particular consideration to species of *Trichosporon*. These fungi are among the increasingly dangerous pathogens among various organisms of yeast-like forms. However, until now they have gained a position of relatively low importance in medical mycology, both from medical and ecological point of view. In the area of the province of Olsztyn they were isolated with increasing frequency showing at the same time an immense potential for transformation and high level of activity in penetrating the respiratory system (D y n o w s k a, 1995).

### MATERIAL AND METHODS

The research material consisted of species of *Trichosporon* isolated from the clinical material provided by the Specialis Unit for Tubercles, Lung Diseases and Oncology in Olsztyn and particular attention was paid to the respiratory system.

The fungi isolated according to the generally accepted guidelines for mycological diagnostics (D y n o w s k a, 1995; K u r n a t o w s k a, 1995) between December

1/1993 and December 1/1994. The macroscopic examinations were performed using solid and liquid Sabouraud media while for microscope examinations Nickerson agar was used.

API-tests (API 20 C and API 20 C AUX) were used for biochemical analysis. For the identification of fungi the works of Lodder, Kreger-van Rij (1967), Barnett, Payne and Yarrow (1990) and Kurnatowska (1995) were used.

In the present study the quantity and frequency of appearance of individual species of *Trichosporon*, sex of the patients as well as type of material and swabs from the pharynx, sputum, bronchoscopic material, urine and swabs from post-operation wounds were analysed.

## RESULTS AND DISCUSSION

The genus *Trichosporon* consists currently of 8 species and one variety. The most common species is studied *Trichosporon beigeli* Vuillemin, *T. pullulans* Diddens et Lodder, *T. capitatum* Diddens et Lodder, and *T. fermentans* Diddens et Lodder are also frequently encountered. *T. behrendii* (Barnett, Payne, Yarrow, 1995) is the most recently described species.

From the studied clinical material 3 species were isolated: *T. beigeli* (= *T. cutaneum* Gougerot et Vaucher), *T. capitatum* and *T. pullulans*. These species were usually accompanied by *Candida albicans* Berkhout which has the strongest pathogenic properties and is most frequently encountered in the respiratory system. In the present study 1993 patients were examined. The occurrence of fungi was noted in case of 888 patients (44%). The presence of representatives of *Trichosporon* was established in 84 patients (9%); of all positive results this is about (Fig. 1).

The fungi examined appeared with the same frequency in females and males. More females were examined. In case of females the fungi were isolated from the sputum while in case of males they were isolated from the bronchoscopic material and sputum (Tab. 1). While the fact of isolation of fungi from sputum could be associated with their presence in the oral cavity as saprophytes the occurrence of the fungi in bronchi is associated with advanced mycosis of the respiratory system (Fig. 2).

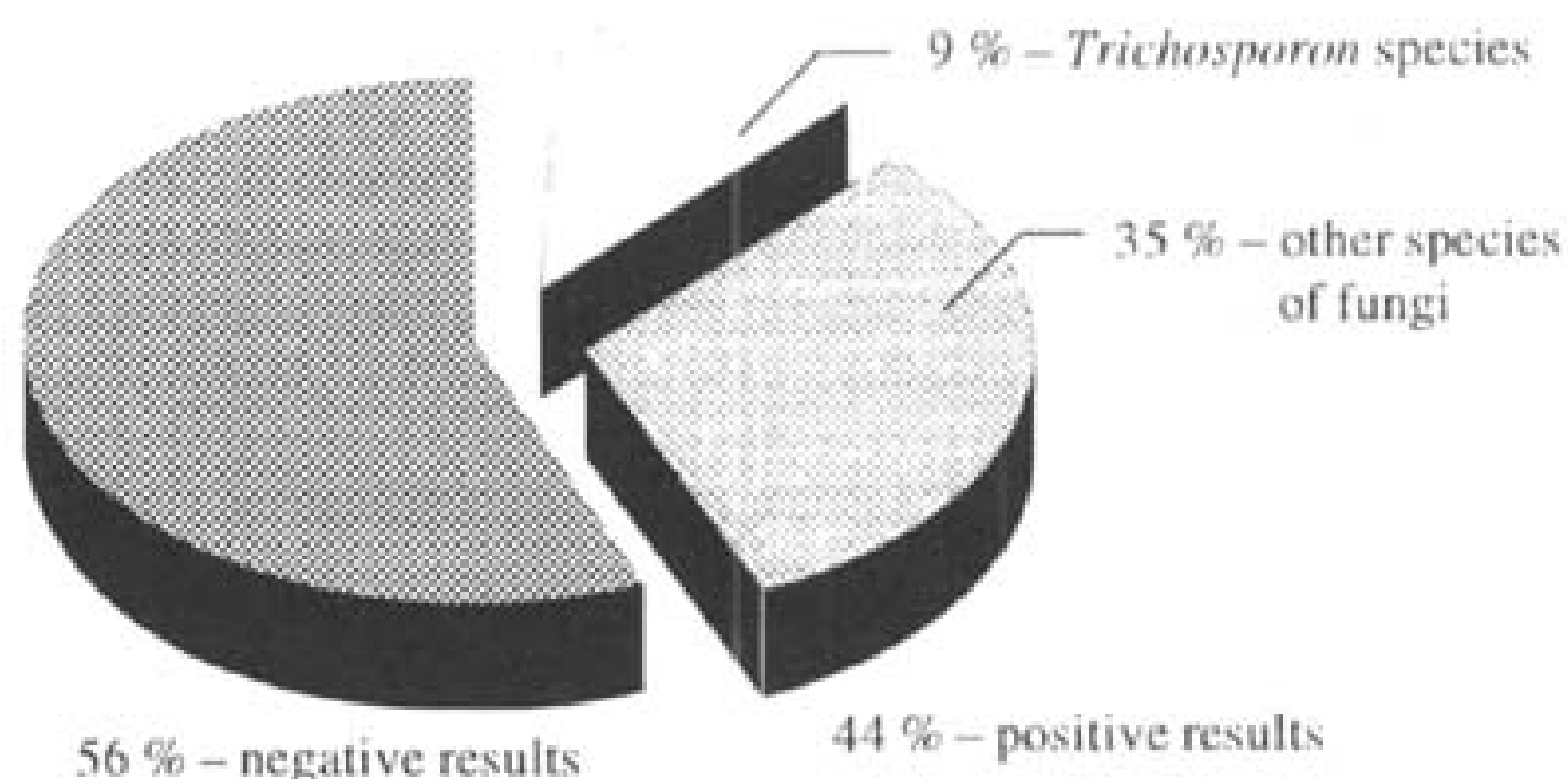


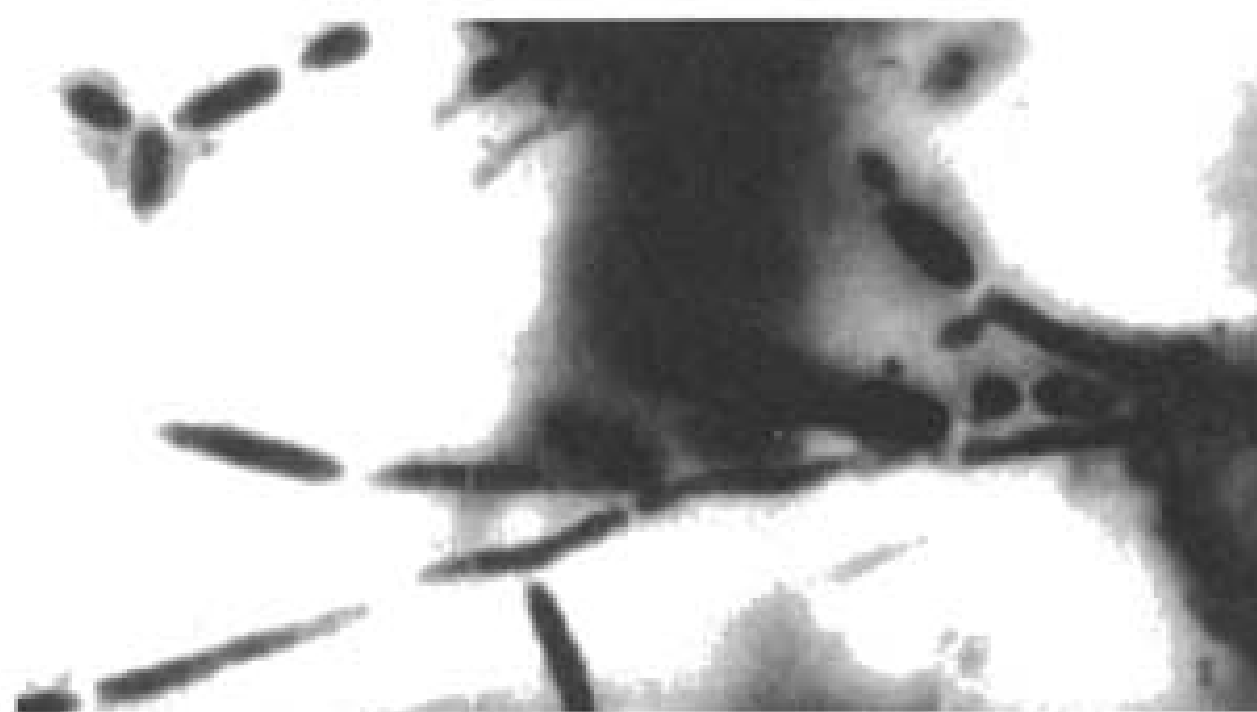
Fig. 1. Proportion (%) of *Trichosporon* species in ontocenosis of the respiratory system

Table 1

Trichosporon species isolated from 84 patients (45 women – w, 39 men – m)

Type of material	Species of fungi					
	<i>T. beigeli</i>		<i>T. capitatum</i>		<i>T. pullulans</i>	
	w	m	w	m	w	m
s	40	15	2	–	–	–
bl	1	19	–	–	–	2
s ph	1	2	–	–	–	–
u	1	–	–	–	–	–
s w	–	1	–	–	–	–

s – sputum, bl – bronchitis lavatio, s ph – swabs from the pharynx, u – urine, s w – swabs from wounds

Fig. 2. *Trichosporon beigeli* – specimen isolated directly from bronchi

The diseases caused by species of *Trichosporon* bear the name of trichosporoses. They are most frequently caused by *T. beigeli* which dominated in the material examined. According to the recent taxonomy elaborated by Barnett, Payne and Yarrow (1990) the genus *Trichosporon* belongs to *Cryptococcaceae*. Lodder, Kregger-van Rij (1967) specified three sub-families within that family *Cryptococcoidae*, *Trichosporoidae* and *Rhodotoruloidae*. *Trichosporoidae* sub-family included just one genus established by Behrend in 1980 (Lodder, Kregger-van Rij, 1967). It was known earlier under the name of *Trichosporon* or *Trichosporium*; the afore mentioned names were introduced by Fries. The second name, *Trichosporium*, was also accepted by Saccardo for fungi which belonged to the *Dematiaceae* family (Lodder, Kregger-van Rij (1967). *Trichosporum* and *Trichosporon* are used for members of the *Cryptococcaceae* family, which have apical blastospores or arthrospores.

There are a number of synonyms for the genus *Trichosporon*: *Proteomyces*, *Trichosporidium* and *Geotrichoides*. Diddens and Lodder (1942) suggested having only one name – *Trichosporon*, which is used in the latest taxonomy of yeast-like fungi (Barnett, Payne, Yarrow, 1990).

Basic criteria in isolating the genus *Trichosporon* and the entire *Trichosporoidae* sub-family from the *Cryptococcaceae* family included the morphology of the mycelium and submycelium, the way and degree of formation of the conides, presence or absence of chlamydospores, fermentation and assimilation of sugars and nitrogen compounds and finally the type of growth on solid and liquid media (B a r n e t t, P a y n e, Y a r r o w, 1990; K u r n a t o w s k a, 1995; L o d d e r, K r e g e r - v a n R i j, 1967). Like other yeasts-like fungi *Trichosporon* belongs to the eury-ecological organisms. They occur in all climatic zones within a wide range of temperature conditions, humidity, pressure, oxidation and acidity, preferring substrates rich in organic compounds. They were isolated from air, soil, fresh and salty waters, from human skin and internal organs and from other vertebrates (D y n o w s k a, 1995; K u r n a t o w s k a, 1995; Ś l o p e k, 1975). In Poland species of *Trichosporon* are most frequently recognized as a keratinophile soil fungi and as allochtonic forms in various water reservoirs, especially those polluted with municipal sewage. This is associated with an increase in the number of cases of mycoses caused by yeasts with an increasing proportion of *Trichosporon* (D y n o w s k a, 1995). The abundant occurrence of *Trichosporon* species in closed and open bathing facilities and in well water is of concern (D y n o w s k a, 1995). K u r n a t o w s k a (1995) isolated species of *Trichosporon* from the reproductive system and less frequently from the urinary system. The author indicated that species from genus may be present, without any symptoms, on the skin showing relation to human and animal keratin. However, the phenomenon of tropism in the case of infestation with yeasts-like fungi is less pronounced than in the case of typical dermatophytes as in addition to the symptoms within the skin and mucous membrane they may cause changes within the body. The best example here is extensive development of species of *Trichosporon* in the respiratory system. Their presence in the respiratory system is attributed to their flexibility, expansive nature and high level of potential for adaptation mainly to their enzymatic activity. As a frequent component of the microflora of the skin, *Trichosporon* species found its way to the oral cavity and started penetrating the respiratory system in which they found a favourable environment for development. It should be noted *T. beigeli* was the most expansive and dangerous species isolated from the material examined.

The present results and the findings of D y n o w s k a (1993) also indicate the changing character of the microflora of different ontocenoses of the human and flexible borders between individual ecological groups of pathogenic fungi.

## REFERENCES

- B a r n e t t J. A., P a y n e R. W., Y a r r o w D., 1990. Yeasts: Characteristic and identification. Cambridge Univ. Press.
- D i d d e n s H. A., L o d d e r J., 1942. Die anaskosporogen Hefen. II Hälfte, Adam.
- D y n o w s k a M., 1993. Changes in microflora of men's respiratory system – observed during last some years-yeasts. Acta Mycol. 28 (2): 151-155.

- D y n o w s k a M., 1995. Drożdże i grzyby drożdżopodobne jako czynniki patogenne oraz bioindykatory ekosystemów wodnych. Studia i Materiały WSP 77, Olsztyn.
- K u r n a t o w s k a A., 1995. Wybrane zagadnienia mikologii medycznej. Wyd. II, Promedi, Łódź.
- L o d d e r J., K r e g e r - v a n R i j N. J. W., 1967. The yeasts a taxonomical study, North.-Holl. Publ. Comp., Amsterdam.
- Ś l o p e k S., 1975. Mikrobiologia lekarska. PZWL, Warszawa.

## Grzyby z rodzaju *Trichosporon* izolowane z układu oddechowego człowieka

### S t r e s z c z e n i e

Badania obejmowały materiał kliniczny pochodzący od pacjentów Specjalistycznego Zespołu Gruźlicy, Chorób Płuc i Onkologii w Olsztynie ze szczególnym uwzględnieniem układu oddechowego i grzybów z rodzaju *Trichosporon*. Wyizolowano 3 gatunki grzybów: *T. beigelii*, *T. capitatum* i *T. pullulans*. Dominował *T. beigelii*, co pozwala uznać go za grzyb najbardziej ekspansywny z wymienionych i wykazujący wysoką zdolność adaptacji w odniesieniu do badanej mikoflory.