



***Sporothrix schenckii* in a hospital and home environment in the city of Pelotas/RS – Brazil**

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ABSTRACT

This study describes the isolation of *S. schenckii* in hospital and home environments in Brazil. Samples were collected from surfaces of a veterinary service place and at home. *S. schenckii* was detected in 1.5% of the samples from the hospital environment. However, this fungus was isolated from all sampled areas in home environments. The isolation of *S. schenckii* demonstrates that these surfaces could act as infection sources to animals and humans. Therefore, employees and pet owners could be exposed to this agent, and the contamination, through surfaces, could occur through the traumatic inoculation of the fungus or by direct contact with pre-existing lesions.

Key words: environment, disinfection, *Sporothrix schenckii*, surface.

INTRODUCTION

Sporothrix schenckii is a fungus found in soil, plants and decaying vegetables. It is the etiological agent of sporotrichosis in humans and several domestic animals (Schubach et al. 2001, Souza et al. 2006, Madrid et al. 2007). This dimorphic fungus grows in a mycelial form at 25°C, progressing to a yeast stage at 37°C. The mycelial phase is characterized by slender, hyaline, septate and branched hyphae containing thin conidiophores whose apex forms a small vesicle with sympodially arranged denticles that produces one conidium arranged in flower-like groups. The conidia detach from the conidiophores and sometimes become bilaterally arranged side by side with the hyphae in a row. The yeast phase is pleomorphic, with spindle-shaped and/or oval cells that resemble a “cigar” (Lopes-Bezerra et al. 2006).

A study has demonstrated the presence of genetic

differences among isolates of *Sporothrix schenckii* obtained from the environment or humans, which raises the possibility of the existence of mutations or other species in the *Sporothrix* genus (Mesa-Arango et al. 2002). In Peru, a genetic diversity among 17 isolates of this fungus obtained from human clinical cases has been described (Holecheck et al. 2004). In addition, three new *Sporothrix* species, namely *S. globosa*, *S. mexicana* and *S. brasiliensis* after their geographical and phenotypic differences, have been recently described (Marimon et al. 2007).

Human contamination through soil manipulation has been described in Venezuela and represents the first description of isolation from the environment at an endemic area (Mendoza et al. 2007). This agent was also isolated from the soil and corn stalks in India and Mexico (Mehta et al. 2007, Pérez et al. 2007). In this context, the aim of this work was to describe the first isolation of *Sporothrix schenckii* in hospital and home environments in the city of Pelotas (RS), Brazil.

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MATERIALS AND METHODS

Contact plates containing Sabouraud dextrose agar with chloramphenicol (SDA)¹ and sterile adhesive tapes, which were immediately seeded in agar SDA, were used for the study of pathogenic fungi in surfaces of hospital and home environments. All plates were incubated at 32°C during five to ten days and observed daily. Samples were obtained from tables, cabinets, stall and walls of the doctor's office and from a hospital room at a veterinary service place. Sampling at the hospital environment was carried out before the beginning of the clinical activities and after room disinfection, which was performed using 0.5%² benzalkonium chloride without a predetermined dilution. In home environments, samples were collected from sofas, rugs, wooden gates and cat beds from two houses with clinical cases of feline sporotrichosis.

After incubation, the macromorphological aspects such as color, texture, topography of colonies and pigmentation of the agar were analyzed. The micromorphological characteristics of the hyphae and conidia were evaluated through direct examination. The colonies compatible with *S. schenckii* were seeded on potato agar³ and incubated at 25°C for 10 days. To verify the dimorphism condition, the colonies were subcultured in a brain-heart infusion broth (BHI)⁴ and incubated at 37°C under constant agitation of 100 cycles per minute during five days. Subsequently, direct examination was performed to evaluate the presence of yeast cells.

The collection performed at the hospital resulted in 136 surface samples obtained before (68) and after (68) the cleaning and disinfection procedures of the table, cabinets, stall and room walls from the doctor's office. Isolation of *Sporothrix schenckii* was obtained in 1.5% of the samples from the wooden surface of a cabinet and the surface of an examination table. From 30 samples obtained at home environments, *S. schenckii* was isolated from all surfaces sampled (Table I). Three hours before collecting at the doctor's office, a 2-year-old male Siamese cat with ulcers, crusts and a brownish exudate in the head was examined on the table. The cat was diagnosed with sporotrichosis by mycological

examination. Disinfection of the stainless steel table was carried out with iodine alcohol at the end of the consultation. Therefore, the fungus remained on the table surface after disinfection.

Sporothrix schenckii has gained great importance in the public health scenario due to the increasing number of cases in humans, felines and canines, as well as zoonotic cases (Barros et al. 2001, Xavier et al. 2004, Madrid et al. 2010). Therefore, isolation of this fungus from surfaces of the veterinary environment alerts for the risk of contamination of people and animals in these places.

S. schenckii isolation from the table at the doctor's office, sofas, rugs, wooden gates and beds could be explained by the fungus contamination from cutaneous lesions of felines with sporotrichosis. The present study shows the less efficacy of iodine alcohol in eliminating *S. schenckii* because the isolation from the table at the doctor's office was achieved after the disinfection. This demonstrates the importance of knowing the effective concentration of the chemical product against fungal agents with pathogenic potential to animals and humans. A study on pathogenic fungi resistance against solvents demonstrated that *S. schenckii* was more susceptible to methanol than to DMSO, acetone and ethanol (Ellof et al. 2007). Another research evaluated the action of chlorhexidine, 70° alcohol, sodium hypochlorite, hydrogen peroxide and ultraviolet radiation against *Candida* spp, *Cryptococcus* spp and *Rhodotorula* spp. Only chlorhexidine at 0.5% exhibited satisfactory results against the isolates (Théraud et al. 2004).

In the last few years, studies concerning the presence of fungus in environments have increased, especially in hospitals. This is mainly because of the presence of susceptible patients in these places, which are more vulnerable to various infections (Andrade et al. 2000, Coutinho et al. 2007, Cucé et al. 1993, Mattei et al. 2011, Mendonza et al. 2007, Martins-Diniz et al. 2005). Isolation of *S. schenckii* has been described in public telephones in Pernambuco (Brazil), in the soil of endemic areas in Venezuela and Mexico, and in cultivated corn stalks next to a house where people had developed mycosis in India (Coutinho et al. 2007, Mehta et al. 2007, Mendonza et al. 2007, Pérez et al. 2007). However, to our knowledge, the isolation of this fungus has not been reported in hospital and home environments in Brazil. Therefore, this study describes the first

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³ Neogen Acumedia®, Michigan/EUA.

⁴ Neogen Acumedia®, Michigan/EUA.

TABLE I
Samples from the doctor's office and hospital room surfaces obtained in search of *S. schenckii*.

Environment	Method of collection	Place of collection	Number of samples	Number of positive samples for <i>S. schenckii</i>
Doctor's Office	Adhesive tapes	Table	16	1*
Hospital Room	Contact plates	Cabinet	40	1**
		Stall	40	–
		Walls	40	–
Home Environments	Contact plates	Sofas	10	6
		Rugs	5	2
		Wooden gates	5	2
		Cat beds	10	4

*After cleaning and disinfection. **Before cleaning and disinfection.

isolation of *S. schenckii* in surfaces of a veterinary hospital and in home environments.

The technique used for the sample collection employed in this study was different from that described by other authors. Coutinho et al. (2007) isolated *S. schenckii* from public telephones in the state of Pernambuco using sterile swabs and sedimentation plates containing Sb+Cl agar. Hence, in October, which corresponds to a drought period in that state, the fungus was isolated from the telephone earphones at bus stations and at the subway. In the rainy season (June) the fungus was isolated not only from earphones, but also from microphones in subways and bus stations.

The presence of *S. schenckii* on wooden surfaces such as gates and the cabinets agrees with the literature description (Lopes-Bezerra et al. 2006) because the fungus inhabits consists soils, tree barks, woods, plants, vegetables and decaying organic matter. Considering that it was a veterinary environment, the contamination can have occurred as a consequence of the presence of cats affected by the mycosis and with high amounts of yeast cells in their lesions and nails. Cats have the natural characteristic of scratching their nails on wood, which is a favorable environment for the fungus. Using oral swabs, Schubach et al. (2001) isolated the fungus from healthy cats that lived together with cats diagnosed with sporotrichosis, whereas Souza et al. (2006) isolated it from the nails of healthy cats. Therefore, these results reinforce the importance of this species regarding the persistence of the fungus in the environment and the transmission of the disease. In home environments, the presence of cats with sporo-

trichosis explained the isolation of the fungus in all contact surfaces.

The presence of *Sporothrix schenckii* in the hospital and home environments alerts to the importance of performing proper disinfection. The fungus in question demonstrates intermediate resistance to chemical products. Hence, the choice of the product and its concentration are fundamental to reduce the number of cells in the environment or to eliminate the fungus (Eloff et al. 2007).

Isolation of *S. schenckii* in the hospital and home environments raises the possibility that these environments and surfaces act as infection sources to animals and humans. Employees and pet owners could be exposed to the agent, and the contamination may occur through the traumatic inoculation of the fungus or by direct contact of pre-existing lesions with contaminated surfaces.

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RESUMO

Esse estudo descreve o isolamento de *S. schenckii* em ambiente hospitalar e domiciliar, no Brasil. Foram colhidas amostras de superfície de local de atendimento veterinário e ambiente domiciliar. *S. schenckii* foi isolado em 1,5% das amostras do

ambiente hospitalar. Entretanto, esse fungo foi isolado em todas as amostras do ambiente domiciliar. O isolamento do *S. schenckii* demonstra a importância dessas superfícies atuarem como fontes de infecção para animais e humanos. Portanto, funcionários e proprietários de animais de estimação estariam expostos a esse agente e a contaminação, através das superfícies, poderia ocorrer pela inoculação traumática do fungo ou pelo contato direto com lesões pré-existentes.

Palavras-chave: ambiente, desinfecção, *Sporothrix schenckii*, superfície.

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