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ORIGINAL ARTICLE

Isolation of fungi from housefly *(Musca domestica L.)* at Slaughter House and Hospital in Sanandaj, Iran

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Key words

Musca domestica • Hospital environment • Slaughter house • Fungi

Summary

Objective. *Houseflies have long been regarded as potential carriers of microorganisms especially fungi. Since pathogenic microorganisms are widespread in the hospital environment, there is abundant opportunity for flies to become contaminated and in turn to contaminate the patient environment and residential regions. The aim of this study was to isolate and identify fungi from the slaughter house and the hospital environments.*
Material and method. *The flies were captured with a sterile nylon net and transferred to the Entomology Laboratory for identification by standard keys. The flies were captured and rinsed in a solution of 1% sodium hypochlorite for three minutes and twice in sterile distilled water for 1min then flies was transferred to a 0.85% saline solution. 0.1ml of this solution was transferred to Sabouraud's dextrose agar (SDA). Isolation of fungi was identified by standard mycological methods.*
Results. *In this study totally 908 Musca domestica (418 flies from the hospital environments and 490 flies from the slaughter house) were collected in Sanandaj, Iran. The main fungi isolated were Aspergillus spp (66%). and another isolated were belong to Penecillium spp. (14%), Fusarium spp. (11.3%), Alternaria spp. (6%) and among the filamentous fungi, 8.6% of the isolates as Microsporum gypseum of dermatophytes was identified.*
Conclusion. *The present study supports belief that the house fly is a carrier for fungal spores. Therefore they have to be controlled and density of their population should be reduced undertaken different vector control approaches.*

Introduction

The house fly, *Musca domestica*, is a well-known cosmopolitan pest of both hospital and Slaughter House. The most important damage related with this insect is the annoyance and the indirect damage produced by the potential transmission of pathogens (viruses, bacteria, fungi, protozoa, and nematodes) associated with this fly [1, 2]. House flies feed indiscriminately on garbage and sewage. In this manner the house flies are able to transport pathogenic organisms from infected materials to human [3]. It has been demonstrated that some microorganisms may live inside and/or on the housefly body surface from 5–6 h up to 35 days [4]. Among the pathogens commonly transmitted by house flies are many species yeast and filamentous fungi that cause illness [5]. The majority of these Fungi caused opportunistic infections that may cause life threatening infections and especially occurring in immunocompromised patients admitted in hospital [6, 7]. Dirt, soil, body discharges and excreta from animals in holding pens are the main Sources of fungal contamination of house flies [8]. A*spergillus spp*. and *Candida spp*. are commonly isolated from the soil, plant debris and the indoor environment, including hospitals [9]. The association of fungi and insects has been verified by several authors [5, 8, 10-12]. The present study was conducted to isolate and identification of filamentous and yeast fungi of medical importance that are pick up by house flies which were collected from the slaughter house and the hospital environments.

Materials and methods

In this study houseflies were collected from Slaughter House and Hospital in Sanandaj, Iran. The flies were captured with a sterile nylon net and transferred to the Entomology Laboratory and placed in the sterile dishes in freeze temperature for 15 min to anaesthetize them. Identification was made by examining the fly (inside test tube) under a dissecting microscope and following standard taxonomic keys [13]. The flies were initially washed in a solution of 1% sodium hypochlorite for 3 min to decontaminate external surfaces, and twice in sterile distilled water for 1 min each. 2 ml of sterile normal saline (0.85%) was added to the tube and the fly was thoroughly shaken for 2 min. 0.1ml of this solution was transferred to Sabouraud dextrose agar (Scharlau, Spain) containing chloramphenicol to inhibit bacterial growth under hood and sterile conditions. The plates were incubated at 25°C and daily observations were made for 15 days. The resulting growth (if any) was identified by standard mycological methods [14]. The grown fungi were identified by standard mycological techniques based upon gross cultural and microscopic morphology. The fungi that could not be identified by this manner

Tab. I. Fungal identification isolated from the external body surface of Musca domestica collected from the slaughter house and the hospital environments.

Species	The hospital environments						The slaughter house		Total	
	Units		Infection garbage		Food garbage					
	N	%	N	%	N	%	N	%	N	%
Aspergillus flavus	2	6.6	10	6.45	18	8.45	15	3	45	30
Aspergillus niger	2	6.6	13	8.38	20	9.3	10	2	45	30
Penicillium spp.	-	-	7	4.69	10	4.69	4	0.8	21	14
Fusarium spp.	-	-	4	3.75	8	3.75	5	1	17	11.3
Microsporum gypseum	-	-	8	1.4	3	1.4	2	0.4	13	8.6
Alternria spp.	-	-	5	0.9	2	0.9	2	0.4	9	6

were subcultured on potato dextrose agar, water agar and /or slide cultures for further study.

Results

A total, 908 houseflies (418 flies from the hospital environments and 490 flies from different part of the slaughter house) were collected. 150 samples as positive cultures were obtained that 38 (7.7%) fungi from the Slaughter house and 112 fungi (26%) were isolated from the hospital environments. The most common isolated fungi were *Aspergillus spp*. with 90 cases and another isolated were belong to *Penecillium spp*., 21 cases, *Fusarium spp.*, 17 cases, *Microsporium gypseum* 13 cases, and *Alternaria spp.*, 9 cases, are shown in Table I. The most prevalent fungi isolated from the hospital environments were *Aspergillus flavus* (31.2%) and *Aspergillus niger* (26.7%) respectively. These two fungal species were also the most frequent among the flies captured at the slaughter house, with a frequency of 3% and 2% respectively. Among the filamentous fungi, 8.6% of the isolates as *Microsporum gypseum* of dermatophytes was identified.

Discussion

The results of the present study revealed that outer body surface houseflies collected from slaughter house and the hospital environments contamination with different fungi. There are more studies which confirm the role of houseflies on transmission of different fungi as mechanical vectors [8, 10, 12]. *Aspergillus spp*. were isolated in higher percentages from among the flies taken from the hospital environments. The opportunistic infectious disease due to *Aspergillus spp*. is of great importance and hospital related invasive fungal infections has been known as the fourth most common cause of this kind of disease [9, 15]. The isolation of these fungi from houseflies in hospital is alarming especially for patients immunocompromised such as recipients of bone marrow or organ transplants whose immune systems have been weakened [16]. In our study, *Microsporum gypseum* of dermatophytes was isolated on the houseflies. Zarrin et al. have isolated two species of dermatophytes (*Microsporum gypseum* and *Trichophyton mentagrophytes*) from same place [8]. The role played by *M. domestica* in the epidemiology of human and animal dermatophytoses is discussed.

The results the current study confirm that flies are much more than a nuisance and that they pose potentially serious health risks as mechanical vectors. the importance of controlling *M. domestica* contamination, especially in hospitals, where immunocompromised people are more likely to be exposed to opportunistic infections. Therefore they have to be controlled and density of their population should be reduced undertaken different vector control approaches.

Considering the per capita of hospital garbage production and its contamination to various types of microorganisms such as fungi, the appropriate management of hospital garbage disposal in order to prevent the accumulation and multiplication of insects especially houseflies and consequently the prevention of various diseases and environmental pollution is highly recommended.

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