

## Isolation of some species of fungi from fecal samples in Zawraa Park Zoo in Baghdad

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Received: 7/2/2016

Accepted: 13/7/2016

### Summary

Fecal samples were collected from eleven animals, representing different species. Samples were collected from cages before daily cleaning, in a clean container; the samples were homogenized in a tube containing sterile saline and kept for 30 min. and then transferring 1 ml of the supernatant into Sabouraud Dextrose broth and incubated at 25-30°C for two weeks. Then 0.1 ml was seeded in Petri dishes containing Sabouraud Dextrose agar with chloramphenicol (50 mg/l). Results indicated high percents of isolate for *Geotrichum candidum* (70.90%) of all animals, the high percents were from Porcupines, Kangaroos, Camels, and ponies (100%), followed by Wolves, Lamas, Dogs, Monkys, Mountain goats, Deers and Lions (83.33, 75, 66.66, 66.66, 50, 28.57 and 20) % respectively. The second high percent of isolate was *Rhizopus* spp. (43.63%) reported in Porcupine, Kangaroo, Camels and Lions was 100% of isolates, followed by Pony (50%), Lama (33.33%), Deers (28.57%) and Monkys (25%). Also *Aspergillus niger* isolates were (3.63%), from Monkys (8.33%) and from deers (14.28%) while *Aspergillus flavus* isolates were (1.81) from Wolves (16.66%) and *Fusarium* spp. isolates were (1.81%), from Wolves (16.66%). The results indicated that zoo animals may be considered as a source of infection and transmission of fungi.

**Keywords:** Fungi, Zoo animal, Feces.

### Introduction

Fungi constitute a very diverse group of organisms that are adopted in a wide variety of environmental and ecological niches. There are about 1.5 million species of fungi that inhabit our environment (1). Currently, as many as 300 fungal species have been associated with human and animal infections (2). Fungi are ubiquitous in distribution and recover from diverse types of substrates such as fruits, vegetables, cereals, rice husk, straw, plant, wood, milk, butter, cheese, red meat, fish, white meat (chicken), compost, sewage, litter, soil, bat guano, pigeon dropping, water and air (3 and 4). Different fungi such as *Cryptococcus gattii*, *Geomyces destructans*, *Fusarium solani*, *Aspergillus terreus*, *Aspergillus flavus*, *Candida glabrata*, *Batrachomyces dendrobatidis* and others have emerged as a significant cause of morbidity and mortality in humans and animals (5 and 6).

Geotrichosis is an infrequent opportunistic mycosis caused by yeasts. The main etiologic agent is *Geotrichum candidum*, which belongs to the class Hemiascomycetaceae, order Saccharomycetales, family Dipodascaceae. It

has been reported to pathologically affect the bronchi, lungs, and bowel, and only seldom the mouth, skin and nails in human. Two other species have also been reported to affect the lung: *Geotrichum capitatum* and *Geotrichum clavatum* (7). Petting zoo visits are communal leisure activities and also have become a significant feature of education for young children. There are about million visits every year, mainly in family groups and school parties; such visits are highly helpful to children in learning about aspects of animal husbandry and farm producing. Close contact with the animals is often encouraged, such as petting and feeding animals.

Fungi were isolates from different spp. of animals: Cow, sheep, turkey, pigeon, duck, poultry, bear, rabbit, monkey and zoo dump collected from Zoo Park (8). Fungi transmitted by wild animals kept as pets have been seen as a public health problem. In addition, a complete cleaning is not possible while animals were housed where breeding in installations, as well as contact with feces, will favor the multiplication and dissemination of the microbes (9). The present study was performed to detect fungi in fecal samples of

zoo animals in Zawraa Park Zoo in Baghdad, Iraq.

### Materials and Methods

Over six month, fecal samples were collected from eleven animal species, representing, different spp. of Monkeys (10), Wolves (6), Porcupines (4), Kangaroos (4), Camels (4), Lamas (3), Ponies (3), Deers (7), Dogs (4), Mountain goats (3) and Lions (5). Samples were collected before the daily cleaning of the site, in a clean container; the sample was homogenized in a tube containing sterile saline and kept at rest for 30 min. and then transferring 1 ml of the supernatant into Sabouraud extrose broth to be incubated at 25-30°C for two weeks; then 0.1 ml were seeded in Petri dishes containing Sabouraud agar with chloramphenicol 50 mg/l. Diagnosis of fungi was based on the characteristics of molds colonies depending on colors, consistency and the reveres, direct microscopic examination (40x) by lactophenol cotton blue stain to see the shape of hyphae, vesicle, conidia and length of conidiophores (11).

### Results and Discussion

The results indicate high percentage isolate of *Geotrichum candidum* (70.90%) in all animals, and the percent of isolates were from Porcupine, Kangaroo, Camel, and Ponies (100%), followed by wolves, Lama, Dogs, Monkeys, Mountain Goats, Deers and Lions (83.33, 75, 66.66, 66.66, 50, 28.57 and 20)% respectively. The second high percent isolate

was *Rhizopus* spp. (43.63%). Porcupines, kangaroos, camel and Lions were 100% of isolates, followed by Ponies (50%), Lamas (33.33%), Deers (28.57%) and Monkeys (25%), while *A. niger* isolate was (3.63%) from Monkeys (8.33%) and from Deers (14.28%) and *A. flavus* isolate were (1.81) from Wolves (16.66%). *Fusarium* spp. also isolate at mean percent (1.81%), from wolves (16.66%). (Table, 1)

Genetic species, subspecies and population diversity shaped zoos an environmental hot spot and sourcing of disease producing microorganisms and predispose cross infection of closely related animals. Around 150 emerging and re-emerging infectious diseases are originating from or harbored in wildlife round the globe (10 and 12). Animals held in captivity or transported even for a short period can be exposed to a variety of pathogens, and become potential carriers of infectious diseases (13). Many studies revealed isolate fungi from birds and animals, *Aspergillus* spp. were isolated from 13 out of 61 fecal cultures from clinically healthy psittacine birds (14). *Aspergillus*, *Rhizopus*, *Penicillium*, *Mucor* and *Fusarium* species were isolated from birds (15), in addition (16) isolate the following filamentous genera: *Aspergillus* spp., *A. niger*, *Penicillium* spp., and *Mucor* spp., The fungal species *Mucor* spp. *Aspergillus fumigatus*, *Aspergillus flavus* and others fungi were isolate from faeces of rooks (17) and *Rhizopus* spp. was isolate from marabou stork faeces (18).

**Table, 1: Percentage of fungi fecal isolates from Zawraa park zoo animals.**

Animal spp.	No.of sample	No. of isolates(%)				
		<i>G.candidium</i>	<i>Rhizopus</i> Spp.	<i>A.niger</i>	<i>A.flavus.</i>	<i>Fusarium</i> Spp.
Monkeys	12	8(66.66)	3(25)	1(8.33)	0	0
Wolves	6	5(83.33)	0	0	1(16.66)	1(16.66)
Porcupine	4	4(100)	4(100)	0	0	0
Kangaroo	4	4(100)	4(100)	0	0	0
Camel	4	3(100)	3(100)	0	0	0
Lama	3	3(75)	1(33.33)	0	0	0
Pony	3	2(100)	1(50)	0	0	0
Deer	7	2(28.57)	2(28.57)	1(14.28)	0	0
Dogs	4	2(66.66)	0	0	0	0
Mountain goat	3	1(50)	0	0	0	0
Lions	5	1(20)	5(100)	0	0	0
Total(%)	55	39(70.90)	24(43.63)	2(3.63)	1(1.81)	

*Geotrichum candidum* is a fungus found worldwide in soil, air, water, and sewage, as well as in plants, cereals, and dairy products;

also it is part of the normal flora of the human skin and the gastrointestinal tract and is isolated from sputum and feces (19), and is the

causative agent of geotrichosis (20), Pulmonary involvement is the most frequently reported form of the disease, but bronchial, oral, vaginal, cutaneous and alimentary infections have also been reported (21 and 22). Our result revealed a high percent of *Geotrichum candidum* isolates from zoo animals, *Geotrichum klebahnii* isolate was (4%) from wild birds (16). Researchers (23) isolate *Geotrichum candidum* from German shepherd with a 3 month history of chronic watery diarrhea. The frequency of these fungi may be a result of the presence of wild and domestic animals, serving as a reservoir of organisms. The second fungi isolate in this study was *Rhizopus*. This fungi was isolated from zoo dump (5.79%) (8). *A. flavus* has been recorded in humans (24), and the infection is also diagnosed in animals which include buffalo, cattle, dog, goat, horse and poultry (25). It is emphasized that the etiologic role of *A.flavus* should be investigated in other species of animals, the results revealed isolate of *A.niger* and *A.flavus* and *Fusarium* that is in agreement with (8) who isolate *Aspergillus flavus* from Monkeys 33.34%, and from zoo dump 15.38%, *Aspergillus fumigates* 16.67%. from Monkeys. Other researcher (26) isolated *A. flavus* at 70%, *A.niger* 40%, *Fusarium spp.* 5% from cattle that suffered from diarrhea. According to the present results it conclusion that the zoo animals in Zawraa Park are the source of this fungi, and with regard to hygiene and health, it is essential to remove the feces and urine of animals in captivity daily, also it must ensure of ventilation and prevention of humidity and providing enough sun in the captivated cages with quarantine measures for infected zoo animals.

### References

- Hawksworth, D. L. (1991). The fungal dimension of biodiversity, magnitude, significance and conservation. *Mycolog. Res.*, 95:641-655.
- Pal, M.; Sisay, T. and Asefaw, Y. (2011). Growing significance of fungi in human and animal health. *J. Nat. Hist.*, 7:82-86.
- Pal, M. (2004). *Aspergillus fumigates* isolated from ornamental plants in India. *Revista. Ibero americana. De Micologia*, 21:218.
- Pal, M. (2007). *Veterinary and Medical Mycology*. 1<sup>st</sup> Ed. Indian Council of Agric. Res., New Delhi, India.
- Pal, M. (2014). *Cryptococcus gattii*: An emerging global mycotic pathogen of humans and animals. *J. Mycopathol. Re.*, 52:1-7.
- Pottier, I.; Gente, S.; Vernoux, J. P.; Guéguen, M. (2008). Safety assessment of dairy microorganisms: *Geotrichum candidum*. *Int. J. Food. Microbiol.*, 126:327-332.
- Ahasan, S. A. And Azam, S. U. (2007). Contribution of Zoological Gardens towards conservation of Wildlife and Biodiversity - Bangladesh perspective. *Zoos' print Magazine*, 22:13-16.
- Sreelatha, A.; Shanthi P.; Girisham, S. (2013). Incidence of Termophilic Fungi in different dung samples of Warangal District of AP. *Int. J. Pharm. Biol. Sci.*, 3:355-359
- Fabiano B. C.; Andréia S.; Edna M.; Cavallini, S. (2010). Fungal microbiota isolated from healthy pig skin. *Acta.Sci.Vet.*, 2:147-153.
- Lisle, DGW.; Bengis, R. G.; Schmitt, S. M.; O'Brien, D. J. (2002). Tuberculosis in freeranging wildlife: detection, diagnosis and management. *Revue Scientifique at Technique des Office International des Epizooties*. 21:317-334.
- Quinn, P. J.; Carter, M. E.; Markey, B. and Carter, G. R. (2004). *Clinical veterinary microbiology*. 6<sup>th</sup>ed. Mosby an imp. Wolf, London. Pp:261-267.
- OIE (Office International des Epizootic). (2000). Zoonoses transmissible from non-human primates. Chapter 2.10.1. In *International animal health code*, 9<sup>th</sup> Ed. OIF, Paris. Pp:285-290.
- Dollinger, P. (2006). Marketing the conservation role of zoos' and aquariums, *Zoos. Print. Magazine*. 21:17.
- Bangert, R. L.; Widders P. R.; Stauber, E. H.; Ward, A. C. (1988). A survey of aerobic bacteria and fungi in the feces of healthy psittacine birds. *Avian. Dis.*, 32(1):46-52.
- Baker, L. R.; Soorae, P. S.; Editors. Re-introduction news. (2002). Newsletter of the Re-Introduction Group of IUCN's Species Survival Commission. Special Primate Issue, 21:60. (ISSN 1560-3709).

16. Furtado, J. M.; Ana Paula, N. A.; Marco, A. A.; Gracialda, F. F. (2014). Fungi Isolated from the excreta of wild birds in screening centers in pelotas, RS, Brazil. Rev. Inst. Med. Trop., 56(6):525-528.
17. Ksenija, V.; Estella, P. R.; Danijela, H.; Marina, P. and Tomislav, G. Z. (2010). Bacterial and fungal flora in faecal samples from rooks (*Corvusfrugilegus*) in the City of Zagreb, Croa. Vet. Ar., 80(1):81-92.
18. Willlam, O.; N. and Wambura, M. (2011). Isolation and characterization of pathogenic bacteria and fungi from *Leptoptilos Crumeniferus* (Marabou Stork). J. App. Techn. In Enviro. Sanit., 1(1):93-106.
19. William, J. D.; Berger, G. and Timothy, G. (2006). Andrews' Diseases of the Skin: Clin. Dermatol., 10<sup>th</sup> ed. Saunders Elsevier. Pp: 216-2921.
20. Mahendra, P. I.; Sunita, S.; Anand, S.; Tesfaye, S. (2013). Geotrichosis - An Opportunistic Mycosis of Humans And Animals, Int. J. Livest. Res., 3(2):38-44.
21. Etienne, A.; Detry, A. and Gaspar, N. (2008). Successful treatment of disseminated *Geotrichum capitatum* infection with a combination of caspofungin and voriconazole in an immunocompromised patient. Mycoses, 51(3): 270-272.
22. Nemet, C. (2006). Parazitoze Umane, Epidemiologie, Clinica, Tratament, Editura University Press-Targu Mures, ISBN (10), 973-7788-71-0; ISBN (13) 978- 973-7788-71-9., Pp:18-65.
23. Ya-Jane, L.; Wei, L.; Chin, F.; Shao, W.; Feng, P. (2010). Intestinal geotrichosis in a German shepherd. Turk. J. Vet. Anim. Sci., 34(5):481-484.
24. Pal, M. and Torres-Rodrigues, J. M. (1990). *Aspergillus flavus* a cause of pulmonary aspergillosis in an occupational worker. Revista Ibero americana De Micologia, 7:33-35.
25. Pal, M.; Tesfaye, S.; Mekonnen, G. A. (2012). Aspergillosis: An important fatal mycotic disease of chicks. Int. J. Lives. Res., 2:69-73.
26. Hassan, A. A.; El-Barawy, A. M. and El Mokhtar, N. M. (2011). Evaluation of Biological Compounds of Streptomyces Species for Control of some Fungal Diseases. J. Ameri. Sci., 7(4):752-760.

### عزل بعض الفطريات من براز حيوانات حديقة الزوراء في بغداد

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#### الخلاصة

جمعت عينات البراز من أحد عشر نوعاً من حيوانات حديقة الزوراء في بغداد، حيث جمعت قبل التنظيف اليومي للموقع في حاويات نظيفة، وأخذت كمية من البراز وتمت مجانسته في أنابيب تحتوي على محلول ملحي وتركه لمدة 30 دقيقة ونقل 1 ملتر من السائل الطافي في مرق سابورود دكستروز وحضن في 25-30 م لمدة أسبوعين، ثم أخذ 0.1 ملتر وزرع على وسط أكارالسابورود دكستروز الحاوي على الكلورامفينيكول (50 ملغم/لتر). أشارت النتائج إلى أن أعلى نسب عزل كانت لفطر *Geotrichum candidum* (70.90%) من جميع الحيوانات، وكانت أعلى نسبة من براز الدلعج، الكنغر، الجمال، وحصان بوني (100%)، تلتها الذئب، الاماء، الكلاب، القروود، الماعز الجبلي، الغزلان والأسود (83.33 و 75 و 66.66 و 66.66 و 50 و 28.57%)، أما ثاني نسبة عزل كانت لفطر *Rhizopus spp* وبنسبة (43.63%)، وكانت تشكل في الدعالج، الكناغر، والجمال والأسود 100% من العزلات، يليه الحصان بوني (50%)، لاما (33.33%)، الغزلان (28.57%) والقروود (25%)، في حين عزلت *Aspergillus niger* (3.36%) وتشمل القروود (8.33%) ومن الغزلان (14.28%) كذلك عزلت *Aspergillus flavus* و *Fusarium spp* (1.81) ومن الذئب (16.66%). أشارت النتائج إلى أن حيوانات حديقة الحيوان تعد مصدراً للإصابة ونقل الفطريات.

الكلمات المفتاحية: الفطريات، الحيوانات البرية، البراز.