International Journal of Forensic Medicine

E-ISSN: 2707-4455
P-ISSN: 2707-4447
IJFM 2023; 5(2): 01-04
www.forensicpaper.com
Received: 03-06-2023
Accepted: 04-07-2023

Iman H Al Fayyadh
Collage of Science, University of Thi-Qar, Iraq

Corresponding Author:
Iman H Al Fayyadh
Collage of Science, University of Thi-Qar, Iraq

Isolation of microorganisms and fungi present on mobile phone screens and wireless headphones in some areas of Dhi-Qar Governorate

Iman H Al Fayyadh

DOI: https://doi.org/10.33545/27074447.2023.v5.i2a.64

Abstract
13 samples were collected from phone screens and headphones, and the sample was collected by a cotton swab and planted on Petri dishes. A number of fungal species were isolated, and their number reached six types of fungi, where the most common fungi in the phone were *Aspergillus*, while the most common fungi in the headphones are *Penicillium* and *Aspergillus* fungi. In addition to that, the highest frequency of phone fungi was the *Aspergillus*, with an incidence rate of 30.76%, and the highest frequency fungi in headphone were the *Aspergillus* and *Penicillium*, with an incidence of 30.76%.

Keywords: Mobile, phone headphones, mushrooms, microbiology

1. Introduction
Fungi are the living organisms that belong to the fungi kingdom, and they are among the most widespread types of living organisms on earth, as the number of fungi species reaches about 144 thousand species, which include; Yeasts, rusts, molds, fungi, molds and fungi of ecological and medical importance (Ghorabchi; 2022) [1].

Cell phones, laptops, and earphones are communication devices that are used on a daily basis. Although we often carry these electronic devices in our bags and pockets, our faces, hands, and ears come into contact with these electronic devices when we communicate. It can be a carrier of a number of microorganisms that live in every inch of the mobile phone screen Microbes that live and thrive on cell phones are due to daily contact with body parts such as the face, ears, and hands and can survive on the surface of a cell phone for weeks. These microbes can cause a risk of infection from a contaminated mobile phone, and one of them causes nosocomial infections (Karuppayil M.S.; 2012) [2].

Top fungi associated with cell phones and cheering *Cladosporium*; *Candida*; *Rhizopus*; *Penicillium*; *Aspergillus* and *Fusarium*. Excessive use of Bluetooth or traditional headphones creates an ideal environment for fungi to thrive.

In addition, any foreign body in the ear can lead to a disease in the auditory canal. That would It also leads to hearing impairment, It also causes yeast infection (Shende K; 2015) [3].

Endophthalmitis is an infection of the inside of the eye. There are two types of endophthalmitis: exogenous and endogenous. Exogenous fungal endophthalmitis occurs after fungal spores enter the eye from an external source. Endogenous endophthalmitis occurs when a bloodstream infection (for example, candidemia) spreads to one or both eyes (Shende K; 2015) [3].

Also, people infected with aspergillosis suffer from the following diseases: *Otomycosis* usually presents with a history of itching, irritation, discomfort, pain and scanty discharge from the affected ear (Mayer AFJK;1844) [6]. There is also a feeling of blockage in the ear due to the collection of debris material in the external auditory canal. Irritation is more marked in the fungal as compared to bacterial otitis externa, Pruritus and discharge are the most common symptoms, with reddened epidermis and lining of the tympanic cavity being common (Laryngol; 1930) [8].

These manifestations are usually unilateral but rarely bilateral involvement has also been seen. *Aspergillus* may cause invasive external otitis (necrotizing or malignant otitis externa) with local spread to bone and cartilage, which is a severe and potentially life-threatening

disease While *Penicillium* fungi cause multiple diseases like Diseases caused by *Penicillium* infection are indicated in association with infections such as *keratitis*, *endophthalmitis*, *ear fungus*, *pneumonia*, *endocarditis*, and *urinary tract infections*, And other other diseases (Otomycosis; 1920) [8].

Aims of the study

1. Isolation and identification of fungi from some frequently used cell phone screens
2. Isolation and identification of fungi isolated from some cultures-
3. Determine the most frequent genders in each of the screens of mobile phones and headphones.

2. Materials and Methods

2.1 Sabouraud Dextrose Agar (SDA)

It is a non-selective isolation medium and it is an ideal environment for the growth of fungi with pH to prevent the growth of bacteria. It is used for the growth of pathogenic and non-pathogenic fungi Prepared according to the manufacturer.

Table 1: Instrument and manufacturer:

No.	Instrument	Company /Origin
1	Autoclaves	Origin company Turkey and Britain
2	incubator	Germany
3	Microscope	Germany
4	Brenner flame	Germany and Britain
5	Hood	American

Table 2: Tools

No.	Tools	uses
1	Petri dishes	A petri dish is used to culture different types of cells, including bacteria and molds.
2	Swab	It is the collection of material from the body or from all surfaces especially mobile screens and headphones
3	Cotton	cotton plugs preserve the culture's integrity through the allowance of air flow, while shielding the culture from dust and other microorganisms
4	Distilled water	In both chemical and biological laboratories, distilled water is used in applications because it removes impurities present in tap water that affect the result.
5	Anti-bacteria	Antibacterial are medicines that kill or stop the growth of organisms that cause infections.

2.2 Sample collection

(13) fungi sample were collected from mobile phones screens and earphones. The sampled were collected by using cotton swab and were grown on pre-prepared media for the purpose identifying and identifying the type of fungi and yeast in the dish.

2.3 Mobile Phones and Bluetooth

A number of mobile phones and mobile phones were used by a group of people who use phones and phones on a daily and frequent basis, with 15 mobile phones and 10 headphones. Swabs were taken from mobile phones and phones for the purpose of isolating and diagnosing the fungi present on them

3. Results

1. Isolation and identification of fungi

Several types of fungi were found from the isolates taken from the phone, *Cladosporium, Rhizopus, Candida, Aspergillus* spp fungus was the highest prevalence and frequency among the fungal isolates with an incidence rate of 30.76%, while the lowest prevalence and frequency was the incidence rate. *Candida* 7.69% and *Rhizopus* 7.69%.

Table 1: Occurrences of the isolation in the sampled mobile phones, Key: type of fungi and percentage%

Genu	Type of Microbe	% Percentage
Cladosporium	Mold	23.07%
Aspergillus.	Mold	30.76%
Candida	Yeast	7.69%
Rhizopus	Mold	7.69%

2. Isolation and identification of fungi from hydrophones: Several types of fungi were found in the isolates taken from the hydrophones *Cladosporium, Penicillium, Aspergillus, Fusarium*.

Penicillium spp fungus was the most prevalent and frequent fungal isolate with an incidence rate of 30.76%. While the least widespread and frequent is the *Fusarium* spp fungus, with an incidence rate of 7.69%.

Table 2: Occurrence of the isolates in the sampled earphones. Key: type of fungi and percentage%

Genu	Type of Microbe	% Percentage
Penicillium	Mold	30.76%
Cladosporium	Mold	23.07%
Aspergillus	Mold	30.76%
Fusarium	Mold	7.69%

Table 3: Occurrence of the isolates in the sampled mobile phone and sampled earphones. Key: type of fungi and percentage% from highest frequency to least frequent

Genus	Type of Microbe	Percentage
Cladosporium.	Mold.	23.07%
Aspergillus.	Mold.	30.76%
Candida.	Yeast.	7.69%
Rhizopus.	Mold.	7.69%
Penicillium.	Mold.	30.76%
Cladosporium.	Mold.	23.07%
Aspergillus.	Mold.	30.76%
Fusarium.	Mold.	7.69%

Through the results of research and statistics, a number of fungi were found in the isolates taken from mobile phones, namely *Cladosporium, rhizome, Candida,* and *aspergillus*. Isolations from Headphones are *Cladosporium, Penicillium, Aspergillus, and Fusarium. Aspergillus* spp *had the highest prevalence an*d frequency among fungal isolates by 30.76%. While least prevalent are *Candida. 7.69% and Rhizopus* SPP 7.69.1%, while the headphone fungus had the highest frequency of *Penicillium* SPP 30.76%, and in addition to Aspergillus SPP 30.76%. The least commonly reported are *Fusarium* spp7.69%, during these results, the proportions of the *Cladosporium* inflections were observed in each of the phones and headphones, as each was Matched to the proportions of the phones and headphones 23.07% *Aspergillus* isolate isolates in Phones and Headphones, where each Matched 30.76%.

Fig 1: Shows *Candida fungi* isolated from a mobile phone

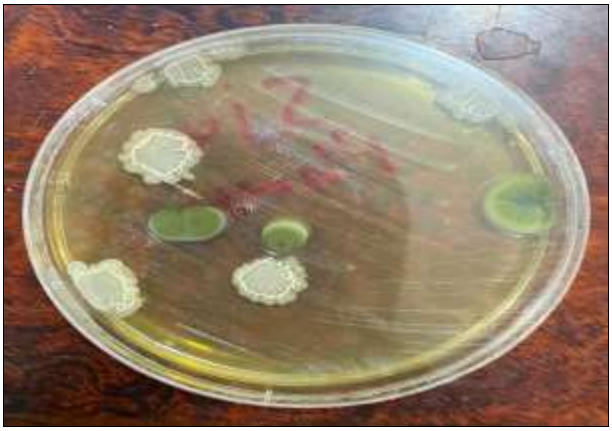

Fig 2: Shows *Candida* and *Aspergillus* fungi isolated from mobile phone

Fig 3: Shows *Penicillium* fungi isolated from headphones

Fig 4: Shows *Fusarium* fungi isolated from headphones

4. Discussion

In addition, a number of fungi were found from the isolates taken from the phone, which are *Cladosporium*, *Rhizopus*, *Candida aspergillus*, Where was a fungi Aspergillus spp. has the highest prevalence and frequency among fungal isolates with an incidence rate of 30.76%, while the lowest prevalence and frequency is rate of occurrence *Candida* spp 7.69% And *Rhizopus* spp. 7.69

These results contradicted the results of the University of Belgrade, Serbia's research on fungal contamination of students' mobile phones, where the fungus with the highest frequency was *Candida* spp 92.9%. While the least frequent is *Aspergillus* = 37.4%.

While when comparing our search results with research results and statistics (Anna Kordecka, *et al*. 01 June 2016) Where we notice the highest percentage of fungi, mobile phone contamination with bleach is high, especially the following types, *Candida glabrata* 89.1%; *Candida albicans* 83.4% And *Candida krusei* 69.7%

It is the dominant species in the samples collected from mobile phones and the lowest frequency is the non-candid fungus with an incidence rate of 0.6%.

Through search results and statistics a number of fungi were found in the isolates taken from the hydrophones, which are *Cladosporium*, *Penicillium*, *Aspergillus*, *Fusarium*. Where the fungus was the highest frequency is *Penicillium* spp. 30.76%

While the least frequent is *Fusarium* pp 7.69%.

These results contradicted the results of Kelechi M Ukaegbu-Obi., *et al*. research conducted by the University of University of (Kelechi Published: March 01, 2019) on earphones used by students, where *Aspergillus* spp 16% was the most frequent and widespread, while *Rhizopus* spp 12% was the least frequent. According to the results and statistics of the research of (Safaa Munim Salman1,b, Mohamd Rtha Al-Sharfee2,c), and Wisam Jasim Abed Ali3,a 11 January 2022) where the largest percentage in isolation among the fungi was *Aspergillus* 3.56% Fungi followed by fungi *Penicillium* spp 0.6%It is less common *Fusarium* spp. 0.2% And these results matched the results and statistics of our search, where the highest prevalence and frequency were *Aspergillus* spp 30,76%.and *Penicillium* spp 30,76% It is the least common and frequent *Fusarium* spp7,69%.

5. Conclusions

The study showed that all mobile phones and earphones under consideration were infected by several microbes. Where fungi in mobile phones showed *Aspergillus* 30.76%, *Cladosporium* 23.07%, *Candida* 7.69%, and *Rhizopus fungus* 7.69%. *Aspergillus* spp fungus was the highest prevalence and frequency among the fungal isolates with an incidence rate of 30.76%, while the lowest prevalence and frequency was the incidence rate *Candida* 7.69% and *Rhizopus* 7.69%

While fungi in the earphones showed percentages of *Cladosporium* 23.07, *Penicillium* 30.76%, *Aspergillus* 30.76%, and *Fusarium* 7.69%, *Penicillium* spp and *aspergillus* spp fungus was the most prevalent and frequent fungal isolate with an incidence rate of 30.76%.

While the least widespread and frequent is the Fusarium spp fungus, with an incidence rate of 7.69%.

6. Recommendations

Avoid excessive use of Bluetooth headphones or traditional headphones, as they create an ideal environment for ear fungus.

1. It is recommended to use hand sanitizer and wash our hands as soon as possible before using the phone as well as after finishing use.
2. Wipe the headphone and speaker grille with a dry cotton swab, not a damp cloth. Finally, let it dry before putting it back in its box or using it.
3. Do not share headphones with others because they are an important means of transmission of germs and organisms that cause infections and other diseases.
4. Also using protective plastic barriers to prevent cross-contamination, such as a non-sterile, disposable cover for your phone or tablet. These covers will act as a barrier between your fingers and the germs on the surface of your device.

7. Conflict of Interest
Not available

8. Financial Support
Not available

9. References
1. Dr. Ghorabchi S. According to the German medical site Gesundheit; c2022.
2. Khan HAA, Karuppayil MS. Fungal pollution of indoor environments and its management. Saudi J Biol. Sci. 2012;19:405-426. doi: 10.1016/j.sjbs.2012.06.002
3. Dave S, Shende K. Isolation and Identification of Microbes Associated With Mobile Phones in Durg District in Chhattisgarh Region, India. Journal of Environmental Science, Toxicology and Food Technology. 2015;1(6):71–3.
4. Al-Ghamdi AK, Ashshi SA, Faidah H, Shukri H, Jiman-Fatani AA. Bacterial contamination of computer keyboards and mice, elevator buttons and shopping carts. African Journal of Microbiology Research. 2011;5(23):3998–4003.
5. Andral G, Gavarret J. Ann Chim Phys; c1843. p. 88.
6. Mayer AFJK. Beobachtung von Cysten mit Fadenpilzen aus dem aussern Gehorgange eines Madchens. Arch Anat Physiol. Wissench Med. 1844;11:404-8.
7. Galloway DJ. Otomycosis of the Malay Archipelago. J Laryngol; c1903. p. 64-70.
8. Cheatle A. Otomycosis. J Laryngol Rhinol Otol. 1920;35:3-4.
9. View of Isolation of Surveillance Pathogenic Fungal Microbial Contaminant on Mobile Phone https://oamjms.eu/index.php/mjms/article/view/oamjms.2019.685/4161
10. "Isolation frequency of *Candida* present on the surfaces of mobile phones and handsx|BMC Infectious Diseases | Full Text" https://bmcinfectdis.biomedcentral.com/articles/10.1186/s 12879- 016-1577-0
11. Al-Abdalall AHA. Isolation and Identification of microbes associated with mobile phones In Dammam In eastern Saudi Arabia. J Family Community Med. 2010;17(1):11-14. Crossref
12. American Academy of Oral Medicine. Oral Yeast Infections (Thrush or Candidiasis). (http://www.aaom.com/oral-yeast-infections) Accessed 5/10/2022
13. Guarro J, Gams W, Pujol I, Gené J. Acremonium species: new emerging fungal opportunists *in vitro* antifungal susceptibilities and review. Clin Infect Dis. 1997;25(5):1222-1229.
14. Kwon-Chung KJ, Bennett JE. Mycetoma. In: Medical Mycology. Philadelphia: Lea & Febiger. 1992;2:560–93.
15. Hay RJ. Dermatophytosis and Other Superficial Mycoses. In: Mandell GL, Bennett JE, Dolin R 3 (Editors). Principle's and Practice of Infectious Diseases the Edition Philadelphia: Churchill and Livingstone Elsevier; c2010. p. 3345-3345.

How to Cite This Article
Fayyadh IH. Isolation of microorganisms and fungi present on mobile phone screens and wireless headphones in some areas of Dhi-Qar Governorate. International Journal of Forensic Medicine**.** 2023;5(2):01-04.