Research Article
Open Access
CrossMark

Use of the biomerieux id 32c fungal identification system for fungal isolated from mother & child hospital dump site in akure, Ondo State Nigeria

Abstract

The purpose of this research work is to isolate and identify Using ID 32C API kit and to determine the antifungal sensitivity profile of fungi isolated from the mother and child dump site Akure, Ondo state, Nigeria. Ten isolates (Yeast, *Aspergilius flavus*, *Aspergilius niger*, *Fusarium solani*, *Candida albucan*, *Candida kruise*, Phytoptera, *Rhizopus stolonifer, Trichoderm horizianum*, *Fusarium vortezelium*) were used for this research work. Potato Dextrose Agar was used to isolate and prepared for enumerated count for fungi colonies. Identification of isolates was performed using API KIT ID 32C. Antibiotics susceptibility testing were observed, to determine the antibiogram profile of the isolated fungi, it was observed that zone of inhibition is higher by 70% resistance to fluconazole and lower by 10% of the fungi susceptibly to texbinazole and miconazole respectively. Also the average total count range from 1.6×10^4cfu/g to 4.6×10^4cfu/g. These finding reinforce the potential risk of waste handling and point out the need for safe management of solid waste, to minimize the spread of these infectious agent in the environment. Filamentous fungi isolation in almost all sample from the environment indicate that a periodic monitoring of airborne microbiota in the health care service environment is required. This result showed that all fungi isolated from the solid hospital waste were resistant to more than one antibiotic during the course of the research work.

Keywords: id 32c API kit, isolation, identification, antibiogram, anitfungal sensitivity test

Volume 6 Issue 1 - 2018

Osuntokun OT,[1] Thonda OA,[2] Ige OO[3]
[1]Department of Microbiology, Faculty of Science, Adekunle Ajasin University, Nigeria
[2]Department of Microbiology, Faculty of Science, Obafemi Awolowo University, Nigeria
[3]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Obafemi Awolowo University, Nigeria

Correspondence: Osuntokun OT, Department of Microbiology, Faculty of Science, Adekunle Ajasin University, Akungba-Akoko, Ondo state, Nigeria, Email osuntokun4m@yahoo.com

Received: February 10, 2017 | **Published:** January 16, 2018

Introduction

Hospital solid waste is any waste which is generated in the diagnosis, treatment or immunization of human beings or animals or in research in a hospital.[1] Despite the enormous volumes of waste produced by health care systems and the increasing concern among scientists, waste generation has received little attention in clinical literature. The isolation of fungal species in health care solid waste is rarely mentioned in the literature[2] described an outbreak of candiduria arising from improper disposal of infectious waste detected by molecular techniques. The health care sector includes a diverse range of health care facilities and activities, ranging in size from large general and specialist hospitals to small medical and dental offices and clinics. Ancillary facilities in this sector include medical laboratories and research facilities, mortuary centers and blood banks and collection services. All of these facilities present common environmental, health and safety issues that need to be addressed at a scale appropriate to the size of the facility and its activities.

Maintenance of sanitary conditions, use of appropriate disinfection and sterilization techniques, provision of potable water and clean air for all operations, and nosocomial infection control are the basic infrastructure requirements for health care facilities. These elements are mandatory to improve the health of patients, prevent transmission of infections among patients and staff, and reduce hazards for employees and the host community.

Solid wastes pose numerous hazards and must be appropriately managed to avoid damage to the environment and human health.[3] Disposal of medical wastes is a growing environmental concern in the developing world. The problem is growing with an ever-increasing number of hospitals, clinics, and diagnostic laboratories universally. Medical waste is infectious and hazardous; posing serious threats to environmental health and requires specific treatment and management prior to its final disposal. Until recently, the management of medical wastes has received little attention despite their potential environmental hazards and public health risks. Although medical waste constitutes a small fraction of the municipal solid waste, the potential environmental and health hazards could be dangerous if not properly handled, the worst scenario being in developing countries. In recent years, medical waste disposal has posed more difficulties with the appearance of disposable needles, syringes, and other similar items.[4] Wastes generated in a hospital are too hazardous to be treated, and carelessness in the management of these wastes tends to spread infections and contaminate the entire living environment prevailing in a hospital. However, since the late 1980's, the spreading trend of Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and other agents associated with blood borne diseases has raised public awareness and concern of the disposition of medical waste. As a result, medical waste is required to be treated in a special way and not to be mixed with municipal waste.[5]

Materials and methods

Collection of sample

The samples for microbiological analysis were collected in clean polythene bags. The solid wastes were collected from Mother and Child Hospital, Akure, Ondo State, Nigeria.

Microbiological analysis sterilization

Glass ware such as beakers, test tubes, petri dishes, conical flask were washed with detergent and rinsed with water. The rinsed glass were sterilized using the oven at 160°C for 2hours and were subsequently allowed to cool before use. All media and distilled water were sterilized at 121°C for 15minutes in the autoclave. Working surfaces were also sterilized by the application of 70% ethanol.[6]

Medium preparation

Potato dextrose agar

According to manufacturer's specification, potato dextrose agar was weighed out on a clean foil paper placed on a beam balance. The amount was dissolved in 100mL of distilled water in a conical flask, shaken and brought to boil in water bath until it dissolved. The conical flask was then plugged with clean cotton wool wrapped in aluminium foil and autoclave at 121°C for 15minutes. The medium was left to cool up to 37°C.

Fungal isolation procedure

The hospital solid waste samples were processed. One gram of samples was suspended in 99mL of sterile distilled water and shaken vigorously for 2minutes then the suspension was serially diluted. Serial dilution of each samples were carried out by first weighing 10grams of each sample into a sterile beaker containing 100mL of sterile distilled water. The beaker was properly shaken, and then 1mL of the liquid from the mixture was aseptically pipette into a test tube containing 9mL of sterile distilled water, which served as the stock culture. One mL of the dilution was aseptically pipette into a test tube containing 9mL of sterile distilled water and the same procedure continues up to the ninth test tube. From the fifth test tube, 1mL of the dilution was aseptically pipette into a sterile petri dish, same for the sixth, seventh, and the ninth test tubes.

Potato dextrose agar that had been sterilized by autoclaving and allowed to cool to about 45°C was poured aseptically into the petri dishes containing the dilutions, and then the selected dilution was streaked onto a potato dextrose agar for even distribution of the inoculums in medium and was allowed to solidify. The plates were incubated at 25°C for 3days (72hours) and the colonies were isolated and plated out. The isolate were observed for their morphological features such as colony shape and coloration. Various fungal colonies were sub cultured by repeated streaking on agar plate in other to obtain pure culture. The fungi isolates were then transferred into agar slant and stored in the refrigerator.[7]

Preparation and sterilization of culture media

Potato dextrose agar

Potato dextrose agar powder (52g) was weighed and poured into 1liter of water. This was homogenized using a magnetic stirrer and hot plate. Chloramphenicol was incorporated into the medium and sterilized in an autoclave for 121°C for 15min. The agar was cooled up to 37o°C on the work bench before utilization.

Preparation and inoculation of samples

The pour plate method of Collins and Lyne was used.[8] The pour plate method was used for culture. About 1grams of the food samples was weighed by taken aseptically with a sterile forceps and transferred carefully into each of the test tubes containing 9.0mL of cooled sterilized water, each food samples in different test tubes were mixed thoroughly to ensure dislodgement and even distribution of microorganisms into the suspended sterile water. A ten-fold serial dilution of each 1mL homogenate was prepared. Exactly 1mL of dilution factor 10^{-4} and 10^{-6} were inoculated into the sterile Petri dishes for culturing. Incubation was carried out at 25°C for 2 - 4days for fungi growth. Spores were counted in order to obtain the total viable unit, discrete colonies were purified by sub-culturing into new prepared agar media and growth was observed under the microscope and then characterized using standard method.

Enumeration of microbial colonies

Colony counting was carried out visually by counting the number of visible colonies that appeared on the plates. Calculation of colony forming unit (CFU) per g for the bacteria and the spore forming unit (SFU) per g for the fungi was based on the formula:

CFU/mL or SFU/g =Number of colonies × dilution factorg of sample suspension

Identification of isolates

Identification of isolates from the solid hospital waste samples was obtained from the incubated potatoes dextrose agar using cultural, morphological and biochemical characteristics USING API KIT ID 32C.

Isolation and characterization of fungal isolates

The fungi colonies that were isolated from the different food samples and grown on the Potato dextrose agar plates were sub-cultured by teasing out the mycelium with a sterile needle and then placing it on a freshly prepared Potato dextrose agar plate which was incubated at 28°C for 48-72hours. This procedure was repeated until a pure culture was obtained. The fungal isolates were examined, after staining the smear with two drops of lacto-phenol-in cotton blue dye under the light microscope using medium and high power objectives.[4] Based on micro-morphological features of colour, types and shapes of spores, conidia and hyphae, the isolated fungi were identified. The fungi characterization was based on micro morphological features which include the following nature of conidia shape, spores head, rhizoid and hyphae (septate or non-septate).

Antibiotics susceptibility testing

Susceptibility to clinically relevant antibiotics was determined following the BSAC Disc Diffusion Method for Antimicrobial Susceptibility Testing Version 9.1.[9] This test is carried out to determine the antibiotic drug that will inhibit the growth of the bacteria isolate already detected from culturing. The plate diffusion technique of[10] was used for the antibiotic sensitivity test. Overnight cultures of the organisms were swabbed on sterile Muller Hilton solidified Agar plates using sterile swab sticks. The multiple antibiotic discs was then placed on the agar surface and pressed using sterile forceps to ensure complete contact with agar. All the plates were incubated at 37°C to 24hours. The zones of inhibition generated by the antibiotics were measured to the nearest millimetres (mm) and interpreted as sensitive (S), Intermediate (I) and resistant (R). The zones of inhibition were measured and interpreted according to (NCCLS, 2000). The antibiotics used and their corresponding concentrations are as follows: it itraconazole, texbinazole, fluconazole, paromycin, miconazole.

Measuring zone of inhibition

The zone of inhibition was measured at the point which an obvious demarcation between growth and no growth can be seen using a meter rule. Zones of inhibition was measured from the back of the plate using reflected light: the plates were hold back a few inches above a black nonreflecting surface, and was measured to the nearest millimeter with a meter rule.[11] The zones of inhibition generated by the antibiotics were measured to the nearest millimetres (mm) and interpreted as sensitive (S), Intermediate (I) and resistant (R).

Total fungal count

One mililiter (1mL) aliquots were transferred from specific dilution level into sterile plates for pour plating using Potato dextrose agar. Incubation was done at room temperature for 3-5days. Average numbers of colonies per dilution were multiplied by dilution to get the total viable count.[12]

Antimicrobial susceptibility assays

The yeast samples recovered from solid waste were submitted to antifungal susceptibility testing that was performed according to the Clinical and Laboratory Standards Institute (CLSI) Broth Micro dilution reference method M27-A2.[13] Fluconazole, itraconazole, terbinacole, paromycin and miconazole were obtained as reagent grade powders from their respective manufacturers. The final concentration of tested antifungals was 0.0-2.0µgmL for fluconazole, 0.0-6.9µgmL for itraconazole, 0·1-2.1µgmL for terbinacole, 0·0-2.4µgmL for paromycin and 0·0-2.0µgmL for miconazole. Measuring Zone of Inhibition (MZI) was read as the lowest antifungal concentration with substantially lower turbidity (decrease of 80% in turbidity) compared to the growth of the antifungal-free growth control well for all agents except for miconazole and paromycin. For those drugs, MZI results were read as the minimal antifungal concentration with complete inhibition of growth. *Candida albicans* ATCC 18.804 was also included as the control organism.[14]

API I D 32C aux system

The inoculated ampule of API C medium was homogenized and 135µl of the suspension was dispensed into each cupule of the strip using the ATB electronic pipette. The lid was then placed on the strip. It was then incubated at 29°C±2°C for 24-48hours.[15]

Results

Table 1 is the Average total fungal count in the solid hospital waste samples in spore forming unit permL (sfu/g) respectively. The table showed that the average total fungi count ranges from 1.6×10^4 - 3.5×10^4 cfu/g. The average total fungi count was highest in samples collected from outpatient department and the least count was observed in medical records department.

Table 1 Shows the Average total fungal count in the solid hospital waste samples in spore forming unit per mL (sfu/g)

Samples	Waste site	Mean colony	Dilution factor	Cfu/g
A	Surgical section	600	106	6.0×104cfu/g
B	Outpatient department	920	106	9.2×104cfu/g
C	Medical laboratory	880	106	8.8×104cfu/g
D	Nurse station	550	106	5.5×104cfu/g
E	Injection room	530	106	5.3×104cfu/g
F	Medical record	460	106	4.6×104cfu/g

A, samples from surgical section; B, samples from outpatient department; C, samples from medical laboratory; D, samples from nurse section; E, samples from injection room; F, samples from medical record

Each figure is an average of values from two replicates

Table 2 shows the Colony (morphological and physiological) characteristics of fungi isolated from solid hospital samples in Potato Dextrose agar (PDA) media. The range is from isolate A to isolate E. Table 3 & 4 shows the biochemical characteristics of bacteria isolated from solid hospital waste samples using API KIT ID 32C. The results identified the isolates as Yeast, *Fusarium solani, Aspergilus niger, Trichoderma horizianum, Candida albucan, Rhizopus stolonifer, Fusarium vortezelium, Aspergilus flavus, Candida kruise* and *Phyptophthora.*

Table 2 Colony (morphological and physiological) characteristics of fungi isolated from solid hospital samples in Potato Dextrose agar (PDA) media

Fungi isolates	Morphological characteristics	Physiological characteristics	Suspected organisms
ISOLATE A	White fluffy and woolly	Non septate	*Fusarium sp*
ISOLATE B	Dirty raised and fluffy	Non septate	*Aspergillus sp*
ISOLATE C	Black, umbrella like mycelium shape	No conidia conidiospore hang the spore at the top	*Phytophthora sp*
ISOLATE D	Yellow, creamy unbranched shape	Presence of conidia with mycelium conidiospore	*Candida yeast*
ISOLATE E	Dirty yellow and fluffy	Non septate	*Rhyzopus sp*

Citation: Osuntokun OT, Thonda OA, Ige OO. Use of the biomerieux id 32c fungal identification system for fungal isolated from mother & child hospital dump site in akure, Ondo State Nigeria. *J Bacteriol Mycol Open Access.* 2018;6(1):12–17. DOI: 10.15406/jbmoa.2018.06.00168

Table 3 Biochemical characteristics of fungi isolated from solid hospital waste samples USING API KIT ID 32C

Organism	SAC	ARA	CEL	RAF	MAL	TRH	SOR	RHA	MEL	MAN	GLU	INO
Yeast	-ve	+ve	-ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	-ve	-ve
Fusarium solani	-ve	-ve	+ve	-ve	+ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
Aspergilus niger	-ve	-ve	-ve	-ve	+ve	-ve	-ve	-ve	-ve	-ve	+ve	+ve
Trichoderma horizianum	+ve	+ve	-ve	+ve	-ve	+ve	-ve	-ve	-ve	+ve	+ve	+ve
Candida albucan	+ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve	-ve	+ve	-ve
Rhizopus stolonifer	-ve	-ve	+ve	+ve	+ve	+ve	-ve	+ve	+ve	+ve	+ve	+ve
Fusarium vortezelium	-ve	+ve	+ve	+ve	-ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve
Aspergilus flavus	+ve	+ve	+ve	+ve	+ve	-ve	+ve	-ve	+ve	+ve	+ve	-ve
Candida kruise	-ve	+ve	-ve	-ve	-ve	-ve	-ve	+ve	-ve	+ve	-ve	+ve
Phyptoptora	+ve	-ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	+ve	+ve	+ve

API KIT ID 32 C

SAC, D - saccharose; ARA, L - arabinose; CEL, D - cellobiose, RAF, D - rafimose; MAL, D - maltose; TRF, D- trihalose; SOR: D - sorbitol; RHA, L - rhamnose; MEL, D - mellobiose; MAN, D - manitol; GLU, D - glucose; INO, inositol; GAL, galcatose; NAG, N- acetyl glucosamine; LAT, lactic acid; 2KG, pottasium (II) ketoglucose; MDG, methyl - alpha D - gluporanosidase; XYL, D - xylose; RIB, R-ribose, GLY, glycerol, PLT, palatinose; ERY, erythrotol; GLT, sodium glucaromate; mLZ, D - melizitose; GLT, potassium glucinate; LVT, lexalinic acid; LAC, D- lactose; INO, inositol

Table 4 Locally isolated fungi from dunmpite and fungal profile from ID.32C

S/N	Organisms	ID 32C KIT
Identification Profile		
1)	*Aspergillus niger*	47674763770
2)	*Fusarium solani*	47677757700
3)	Yeast	17427207770
4)	*Aspergillus .flavus*	07630577140
5)	*Phytophera megakarya*	57553146710
6)	*Candida kruise*	77071703110
7)	*Rhizopus stonifer*	03434235050
8)	*Trichoderma horizionum*	61412162770
9)	*Fusarium vortercelium*	13431522210
10)	*Syncephalastrum racemosum*	13331225210

Table 5 shows the various zones of inhibition exhibited by the different bacteria isolated from the hospital solid waste. The table further showed that all the antifungal drugs caused zones of inhibition on selected isolates.

Discussion

In this project, the microbial quality of the selected solid hospital waste samples were studied. A total of six samples (samples A-F) were collected from Mother and Child Hospital and were tested quantitatively and qualitatively. From Table 1, the total average of fungal spore count in outpatient department of the hospital. It was observed and reported that the highest number of microbial load with 9.2×10^4sfu/g were found in the outpatient department of the hospital. The average fungal count was highest in the outpatient department of the hospital (9.2×10^4cfu/g) and was lowest in the Medical Records unit (4.6×10^4cfu/g) (Table 1). It was observed that the outpatient department has the highest fungal count due higher accessibility to patients and visitors which may introduce more fungal into the section of the hospital and the lowest fungal count in the medical record department was due to less accessibility to patients and visitors which may introduce fewer fungi into the section for the Medical Records unit. The organisms suspected include *Fusarium sp, Aspergillus sp, Phytophthora sp, Candida yeast, Rhyzopus sp* (Table 2).

The high microbial load in the solid hospital waste samples depicts a deplorable state of poor hygienic and sanitary practices employed in the generating and disposal of waste in the hospital. These solid hospital samples contain Yeast, *Fusarium solani, Aspergilus niger, Trichoderma horizianum, Candida albucan, Rhizopus stolonifer, Fusarium vortezelium, Aspergilus flavus, Candida kruise* and *phytoptora. Fusarium vertezelium* was the most resistant strain. It showed reduced susceptibility to terbinafine, paromycin and miconazole with zones of inhibition to be 0.0mm in all. It also showed reduced susceptibility to itraconazole and fluconazole with zones of inhibition to be 2.0mm in both antifungals (Table 5).

Table 5 Various zone of inhibition exhibited by different fungi isolated from solid hospital waste

Organism	ITK	TER	FLU	PAR	MIC
Yeast	12	16	14	16	12
Fusarium solani	10	11	13	15	17
Aspergilus niger	23	19	20	22	15
Trichoderma horizianum	69	10	8	10	12
Candida albican	20	15	8	19	20
Rhizopus stolonifer	20	18	17	21	10
Fusarium vertezelium	2	0	2	0	0
Aspergilus flavus	17	15	12	10	9
Candida kruise	30	21	26	24	18
Phyptophthora	0	1	0	9	0

ITK, itraconazole; TER, terbinafine; FLU, fluconazole; PAR, paromycin; MIC, miconazole

Citation: Osuntokun OT, Thonda OA, Ige OO. Use of the biomerieux id 32c fungal identification system for fungal isolated from mother & child hospital dump site in akure, Ondo State Nigeria. *J Bacteriol Mycol Open Access.* 2018;6(1):12–17. DOI: 10.15406/jbmoa.2018.06.00168

All pathogenic strains and may cause different types of diseases in the human body. Organisms isolated from surgical, medical lab department, and nurse station had moderate growth, around 8.8 $\times 10^4$sfu/g, 6.0 $\times 10^4$sfu/g and 5.5 $\times 10^4$sfu/g respectively on average in agar media.[14]

The organism isolated from medical record department shows the lowest growth of microorganism in the agar plates with an average of 4.6 $\times 10^4$sfu/g. due to the fact that solid waste are usually aseptically collected and disposed properly, this may be why microbial count was low. Therefore, the microbial counts in the solid hospital waste samples were within the standards or limits for acceptable environmental waste disposal method.[15,16] Therefore if this multi-drug resistant strain isolated from this section of the hospital, i.e., Out patient, medical record etc, it may not succumb to treatment with terbinafine, paromycin, miconazole, itraconazole or fluconazole. Similarly, Phyphthora showed resistance to multiple antifungals in itraconazole, fluconazole and miconazole with 0.0mm as zones of inhibition in all. It also displayed reduced sensitivity terbinafine and paromycin with values of zone to inhibition as 1.0mm and 9.0mm respectively. Therefore if this multi-drug resistant strain is isolated, it may not inhibited by the treatment with terbinafine, paromycin, miconazole, itraconazole or fluconazole.

However, *Aspergilus niger* showed highest sensitivity with zones of inhibition to be 23.0, 19.0, 20.0, 22.0 and 15.0 in itraconazole, terbinafine, fluconazole, paromycin and miconazole respectively (Table 5). During the course of this research work, it was observed that, all organisms were more sensitive to itraconazole, 5 isolates and 50% sensitivity (Table 6) and were least sensitive to fluconazole with 70% resistance (Table 6). The implication being itraconazole would be better in managing fungal infections in the hospital facility.

Table 6 Shows the number(s) and percentage of fungal isolated from hospital solid waste in relation to the zone of inhibition of the various antifungal used

Antibiotics	ITK	TER	FLU	PAR	MIC
N % S	5 (50%)	1 (10%)	2 (20%)	3 (30%)	1 (10%)
N % I	1 (10%)	5 (50%)	1 (10%)	3 (30%)	3 (30%)
N % R	4 (40%)	4 (40%)	7 (70%)	4 (40%)	6 (60%)

ITK, itraconazole; TER, terbinafine; FLU, fluconazole; PAR, paromycin; MIC, miconazol; N%S, number(s) and percentage of susceptible fungi isolates; N% I, number(s) and percentage of fungi with intermediate zone of inhibition; N% R, number(s) and percentage of resistance fungi isolates

However, from the results of standard biochemical test for identification of all the ten (10) isolates from the solid hospital waste samples it has been seen that the solid hospital waste samples contains *Aspergillus spp* (30%), *Fusarium spp.* (17.4%), Yeast (17.4%), which are the predominant organisms, followed by *candida* (13%), *Rhizopus spp.* (8.7%) *and Tricodermer spp.* (8.7%) and *Phytoptora spp.* (4.3%), respectively in all solid waste samples. These strains are the resident and transient fungi, respectively on hands and are associated with poor hygiene practice.[17]

Contamination with *Aspergillus spp.* which has higher percentage of occurrence in all solid hospital waste sample of 30% have resulted from pre and post handling of the solid hospital waste.[18] It is normal skin flora of 25% waste site and it does not cause diseases unless it gets into the human system which is significant among *Aspergillus* genus as it can produce different types of toxins which are heat resistant. According to Lasker et al.,[19] *Aspergillosis* infection could cause blood poisoning, caused by enterotoxin-producing strains of *Aspergillus spp*, was the most common illness borne. Toxin production strains of Staphylococcus are the leading cause of gastroenteritis following handling of hospital materials, drugs, dressing materials etc by the person who carries the microorganism in their nose and skin. it was suggested that the solid waste contamination in the hospital is mainly due to poor quality and hygiene in the handling of hospital materials and equipment and It was also observed that the minimum percentage of resistant fungi isolate was 40% which may show a high degree of multi-drug resistant fungi across board in the hospital.[20]

The presence of *candida spp.* indicates poor practice sanitary conditions during handling, and transportation of hospital materials. The organisms gaining access to patients thereby cause nosocomial infection or disease outbreaks. Manyele[21] has also reported *Candida spp* as a well-known cause of illness that is not commonly reported because of its usually mild symptoms. However, he described a fatal family outbreak due to liver failure after the consumption of *Candida spp.* spores adhere to many surfaces and survive normal washing and disinfection (except for hypochlorite and UVC) procedures, which can be accountable for its prevalence in hospital environment. *Candida spp* are also a common inhabitant of the human gut and a urinary tract pathogen, widely distributed in the environment and have been isolated from the intestinal tract of mammals, animals and birds (chicken and turkey).[22]

Also in this study, the antimicrobial sensitivity test was carried out on the fungi isolated and were found to be of public health significance, and were tested against the following antibiotics namely Itkaconazole, Texbinacole, Fluconazole, Paromycin and Micanazole respectively. The result shows the resistance profile of the bacteria isolated from the solid hospital samples.

Conclusion

In conclusion, Filamentous fungi isolation in almost all sample from the environment indicate that a periodic monitoring of airborne microbiota in the health care service environment is required. We can imply from the result that all fungi isolated from the solid hospital waste were resistant to more than one antibiotic during the course of the research work, further studies are needed to establish the relationship between health risk level and Hospital solid waste. Despite the lack of data in the literature concerning airborne fungi in health services, this results suggest that these environments are ecologically similar to other health care environments. This makes them potentially critical regarding cross-infection control. Airborne fungi measured inside clinical/surgical environment indicate that storage rooms may provide very favourable conditions for survival/dispersion of airborne fungal spores. Considering the biological risk, all health care institutions should establish a safety programme for health care workers in the attempt to prevent accidents and cross infection.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

References

1. Albert FI, George SM. Hospital solid waste management. *CRC Critical Reviews in Environmental Control*. 1970;1:1–4.

2. Jang SJ, Han HL, Lee SH, et al. PFGE–based epidemiological study of an outbreak of *Candida tropicalis* candiduria: the importance of medical waste as a reservoir of nosocomial infection. *Jpn J Infect Dis*. 2005;58(5):263–267.

3. Hassan MM, Ahmed SA, Rahman KA, et al. Pattern of medical waste management: existing scenario in Dhaka City Bangladesh. *BMC Public Health*. 2008;8:36

4. Askarian M, Vakili M, Kabir G. Results of a hospital waste survey in private hospitals in Fars Province, Iran. *Waste Manag*. 2004;24(4):347–352.

5. Ajadike JC. Pollution and management problems of medical waste in Nigeria. In: Adina EN, Bkop OB, editors. *Environmental Pollution and Management in the Tropics*. USA: SNAPP Press Ltd; 2003. p. 243–252.

6. Alam M, Miah M, Ahmad H. Composite polymer particles with stimuli–responsive surface properties and specific activity of adsorbed/released trypsin. *Colloid & Polymer Science*. 2007;285(6):715–720.

7. Manyele SV. Medical waste in Tanzania: Current situation and the way forward. *African Journal of Environmental Assessment and Management*. 2004;8:74–99.

8. Itah AY, Ekpombok MU. Pollution status of swimming pools in south–south zone of south–eastern Nigeria using microbiological and physicochemical indices. *Southeast Asian J Trop Med Public Health*. 2004;35(2):488–493.

9. Andrews JM, Howe RA. BSAC standardized disc susceptibility testing method (version 7). *J Antimicrob Chemother*. 2008;62(2):256–278.

10. Willey JM, Sherwood LM, Woolverton CJ. *Prescott, Harley, and Klein's Microbiology*. USA: McGraw Hill; 2008. p. 123–156.

11. Ericsson BH, Tunevall G, Wickman K. The paper disc method for determination of bacterial sensitivity to antibiotics: Relationship between the diameter of the zone of inhibition and the minimum inhibitory concentration. *Scandinavian journal of clinical and laboratory investigation*. 1960;12(4):414–422.

12. Abdullah N, Nawawi A, Othman I. Survey of fungal counts and natural occurrence of aflatoxins in Malaysian starch–based foods. *Mycopathologia*. 1998;143(1):53–58.

13. Jahn B, Martin E, Stueben A, et al. Susceptibility testing of *Candida albicans* and *Aspergillus species* by a simple microtiter menadione–augmented 3–(4, 5–dimethyl–2–thiazolyl)–2, 5–diphenyl–2H–tetrazolium bromide assay. *Journal of Clinical Microbiology*. 1995;33(3):661–667.

14. Martins DM, Etebarian HR, Mirhendi SH, et al. Identification andphylogeny of some species of the genera Sporidiobolus and Rhodotorula using analysis of the 5.8s rdna gene and two ribosomal internal transcribed spacers. *ArchBiological Science*. 2005;63(1):79–88.

15. Nunes JM, Bizerra FC, Ferreira RC, et al. Molecular identification, antifungal susceptibility profile and biofilm formation of clinical and environmental *Rhodotorula spp*. isolates. *Antimicrobial Agents Chemother*. 2013;57(1):382–389.

16. Samonis G, Anatoliotaki M, Apostolakou H, et al. Transient fungemia due to Rhodotorularubra in a cancer patient: case report and review of the literature. *Infection*. 2006;29(3):173–176.

17. Jang J, García AL, García MP, et al. Enzymatic activity of *Rhodotorula glutinis* strains isolated from clinical and environmental sources. 2005;12(1):11–13.

18. Biswas SK, Yokoyama K, Nishimura K, et al. Molecular phylo– genetics of the genus Rhodotorula and related basidiomycetous yeasts inferred from the mitochondrial cytochrome b gene. *Int J Syst Evol Microbiol*. 2008;51(3):1191–1194.

19. Lo Re V, Fishman NO, Nachamkin I. Recurrent catheter–related Rhodotorularubra infection. *Clinical Microbiology Infectiou*. 2006;9(8):897–900.

20. Diekema DJ, Petroelje B, Messer SA, et al. Activities of available and investingational antifungal agents against rho– dotorula species. *J Clin Microbiol*. 2006;43(1):476–478.

21. Manyele AO. Antifungal susceptibility of Candida species isolated from candidura. *Jundishapur Journal Microbiology*. 2004;6(1):24–26.

22. Sherman KJ. Sensitivity of vaginal isolates of Candida to eight antifungal drugs isolated from Ahvaz, Iran. *Jundishapur Journal Microbiology*. 2012;5(24):574–577.

Citation: Osuntokun OT, Thonda OA, Ige OO. Use of the biomerieux id 32c fungal identification system for fungal isolated from mother & child hospital dump site in akure, Ondo State Nigeria. *J Bacteriol Mycol Open Access*. 2018;6(1):12–17. DOI: 10.15406/jbmoa.2018.06.00168