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MICROBIAL ANALYSIS OF SLICED WATERMELON, PINEAPPLE AND PAWPAW FROM FIVE LOCATION MARKETS IN ILORIN

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ABSTRACT

The microbial contamination of ready-to-eat vended fruits in Ilorin market was examined using standard microbiological methods. A total of fifteen (15) samples of vended fruits were screened for total bacterial and fungal count. From examination five (5) bacterial species were isolated namely: *Escherichia coli*, *Staphylococcus aureus*, *Salmonella* sp, *Shigella* sp and *Pseudomonas* sp while one (1) fungal species, *Mucor* sp, was isolated from the vended fruit samples. The total aerobic plate count ranged from 1.50±0.50 - 25.00±3.00 CFU ml-1 with Pawpaw having the highest count and Pineapple having the lowest count. The isolated organisms from the vended fruits showed that contamination occurred due to poor hygiene and environmental factors like contaminated air. Therefore adequate tutorials on sanitary practices on both individuals and environment should be encouraged by concerned government officials to reduce the level of contamination in vended fruits.

INTRODUCTION

Fruits are rich in vitamins, minerals, antioxidants and many phytonutrients. Fruits and vegetables are essential parts of people's diet and are vital for health and well-being. They help to reduce the risk of several diseases. Sliced fruits refer to fruits that have been cut open, sliced into bits, but remain in the fresh state and displayed for sale in retail outlet for consumption. These sliced fruits are bought directly from the street vendors or hawkers or at local market without necessarily having to undergo any further treatment before consumption (AbdulRaouf *et al.*, 1993).

Watermelon (*Citrullus lanatus*) belongs to the family Cucurbitaceae, the same family as cucumber, pumpkin, and squash. It grows in countries that have a long, warm growing season such as China, Africa, India, and the United States. China is the world's largest watermelon producer with 13.9 billion pounds produced in 2008, followed by Turkey, Iran, Brazil, and the United States, which produced 4.3 billion pounds that same year. The major producing state is Florida with 817 million pounds produced in 2009, followed by California, Georgia, Texas, and Arizona (Aboloma, 2008).

Watermelon originated in Africa and it has been an important vegetable in Egypt for at least 4,000 years. By the tenth century AD, it was grown in China and South Russia and was later introduced to the New World by the Spaniards in the sixteenth century. For many years, it has been a source of water in the Kalahari Dessert and other areas of Africa. Watermelons are mostly eaten fresh, but in Africa they can also be cooked. In south parts of the old Soviet Union, watermelon juice is made into a fermented drink or it can be boiled down into syrup. The rind can be pickled or candied and the seeds can be roasted or eaten as it is done in the Orient and Middle East (Barro *et al.*, 2007).

The pineapple (*Ananas comosus*) is a tropical plant with an edible fruit, also called a pineapple, and the most economically significant plant in the family Bromeliaceae.

Pineapples may be cultivated from the offset produced at the top of the fruit, possibly flowering in five to ten months and fruiting in the following six months. Pineapples do not ripen significantly after harvest.

In 2016, Costa Rica, Brazil, and the Philippines accounted for nearly one-third of the world's production of pineapples (Traore, 2007).

Pawpaw (*Carica papaya*) is a member of the small family (Caricacea), having four genera and thirty-one species, is a native of tropical America, now spread all over the tropical region of the world. The fruits are eaten green or ripe, fresh or in salads because of its high sugar content (59%) and thus can be used for wine production. They are also used for making juice and crystallized fruit. Processed, it has a neutral taste that can be considered improved by the addition of passion fruit to make soft drinks and various preserves. It can also be used in production of latex (Barro *et al.*, 2006).

Consumption of sliced fruits has been on the increase since they are easily accessible, convenient and most especially cheaper than the whole fruit. Sliced fruits are commonly processed and sold by unlicensed vendors with poor educational levels and untrained in food hygiene. Vended fruits have been on the increase in many developing countries due to lack of formal jobs for the working age groups. Sales of sliced fruits can contribute significant income for households and at the same time providing a source of inexpensive nutritious meal (Bean and Griffin, 1996).

Outbreak of illness caused by consumption of fruits had been reported. The increase in consumption of sliced fruits has been linked with a parallel increase in food borne illness. Fruit produce is known to carry a natural non- pathogenic micro flora, and have an epidermal layer of cells which provides a barrier for penetration of microorganisms. Cutting and slicing can eliminate the protections and microbes can invade the internal tissue. Unsanitary processing and preservative methods could increase the possibilities of contamination. Open display of street food produce encourages sporadic visits by flies, cockroaches, rodents and dust (Beuchat, 1995).

MATERIALS AND METHODS

Study Area

This study was conducted in Microbiology Laboratory Unit, Kwara State University, Malete, Ilorin, Kwara state. The samples was collected from different fruit vendors in Ilorin Markets, Kwara State. There are various market in Ilorin with different people selling different items like foodstuffs, fruits, vegetables, wears and other exciting goods. A great number of traders there are involved in fruit

selling. And most of them are sliced or processed because most of their customers may not be able to afford or have time to process the fruits properly.

Materials and Reagents

The materials and reagents that was used during the course of this research include: weighing balance, beakers, conical flasks, autoclave, petri-dishes, 70% ethanol, non-absorbent cotton wool, aluminium foil, test tubes, wire loops, incubators, microscope, blender, nutrient agar, potato dextrose agar, mannitol salt agar, *salmonella-shigella* agar, EMB, macConkey agar, peptone water and distilled water.

Collection of Samples

A total of fifteen (15) vended fruit samples consisting of sliced watermelon, pineapple and Pawpaw were collected. The sliced watermelon, pineapple and pawpaw were collected from five different fruit vendors in Ilorin market. They were all collected and put into different white polyethene bags to differentiate them based on the vendors they were bought from.

Media Preparation

The different media which included nutrient agar, potato dextrose agar, mannitol salt agar, macConkey agar, EMB agar, salmonella-shigella agar; and peptone water was prepared according to the manufacturer's instruction.

Isolation of Microorganisms

About 10g of each of the fruit samples was weighed and homogenised in 90ml of sterile distilled water using an electric blender or mortar and pestle. Then, ten-fold dilutions of the homogenates was made with sterilized peptone water; after that 1ml of the 10^{-4} dilutions of the homogenates are dispensed into the petri-dishes that were labelled based on the agar used by pour plate method and allowed to gel. After gelling, the petri-dishes that contained mannitol salt agar, nutrient agar, macConkey agar and SSA agar was incubated at 37°C for 24hours while the petri-dishes that contained potato dextrose agar was incubated at 25°C for 3days. The nutrient agar, macConkey agar, mannitol salt agar and SSA agar was used to check for total bacterial count, total coliform count, presence of *Staphylococcus aureus*, *Salmonella* spp and *Shigella* spp. respectively. At the end of the incubation period, the plates was

brought out of the incubators and the colonies was counted using a colony counter device and each count was expressed in colony forming unit per ml (CFU ml¯).

Isolation of the Cultured Microorganisms

The distinct colonies on nutrient agar and potato dextrose agar was carefully examined using microscope for their morphological characteristics like colour. Then these colonies was subcultured on nutrient agar using streaking method and was incubated at 37°C for 24hours.

Identification of Isolates

Gram staining and other biochemical tests was carried out based on the method of Cheesbrough (2006). The biochemical tests performed here include catalase, oxidase, indole, coagulase, Methyl red, Voges proskauer, Citrate, Sugar fermentation and Oxygen relationship test.

Gram Staining

A thin smear of the isolates was carried out on different slides with the aid of a wire loop and left to dry and after they will be heat fixed and allowed to cool. Then the different smears were covered with crystal violet stain for 30-60seconds and rapidly washed off with clean water. Then the smears were covered with Lugol's iodine for 30-60seconds and rapidly washed off with clean water. The smears were decolourised rapidly with alcohol and washed out immediately with clean water. Then the smears were covered with safaranine for 30-60seconds and washed immediately with clean water. The stained smears were then allowed to air-dry. After drying, a few drops of oil immersion was dropped on the stained smears and viewed with the aid of a microscope (×100 oil objective lens) to check for the microscopic properties of the organisms like the Gram reaction, morphology (Cheesbrough, 2006). For the fungal isolate, a drop of lactophenol cotton blue stain was dropped in the centre of a clean slide. And then a fragment of the fungus were collected with the aid of a wireloop and placed in the drop of the stain and teased gently and covered with a coverslip. The coverslip was not pushed down or tapped to avoid the dislodging of the conidia from the conidiophores. Then the stained isolate was viewed under the microscope with ×10 and ×40 objective lens for its morphological characteristics (Cheesbrough, 2006).

Biochemical Tests

Catalase Test

The discrete colonies of each of the isolates were collected with a wooden stick and emulsified in a drop of hydrogen perioxide (H2O2). Bubbles of gas indicated a positive result according to Cheesbrough (2006).

Indole Test

Here a little portion of each of the isolates was inoculated into 5ml of sterilised prepared peptone water which was contained in different test tubes using a wire loop. And then, the test tubes containing the organisms was left to incubate at 37°C for 48hours. After incubation period, 3-4drops of indole reagent known as Kovac's reagent was added and shake gently. A positive result gave a red surface layer after 10minutes while a negative result gave a no red surface layer after 10minutes according to Cheesbrough (2006).

Oxidase Test

A piece of filter paper was placed in a clean petri dish and 2-3drops of freshly prepared oxidase reagent was added. With the aid of a wooden stick, discrete colonies of the isolates was collected separately and smeared on the filter paper. A positive result gave a purple-blue colouration after 10seconds while a negative result gave no such colour after 10seconds according to Cheesbrough (2006).

Coagulase Test

A drop of distilled water was placed on each end of a slide and a colony of the test organism was been emulsified in each of the drops to form a thick suspension. Then a loopful of plasma was added to one of the suspensions and swirled gently. A positive result showed clumping after 10secconds while a negative result showed no clumping after 10seconds according to Cheesbrough (2006).

Citrate Utilization Test

The Simon's citrate agar was prepared according to specification of the manufacturer in sterilized Petri dish; it was inoculated with the test organism and incubated at 37˚C in the incubator for 3 days. A change in colour from green to blue indicated a positive result and a negative result remained green.

Sugar Fermentation Test

The fermentation medium was prepared and sterilized with the indicator and durham's tube has no air bubbles in them. The sugar solution was autoclaved at 10 ibs/sq inch pressure for 10minutes and 0.5ml of the sugar was added to sterile peptone water. The fermentation tubes were inoculated with the test organism. Negative control was maintained for all the sugar. The tubes were incubated at 37 ^{0}C for 24-48hrs. colour change was observed.

Oxygen Relationship Test

Nutrient agar was prepared and dispensed into McCartney bottles and slanted; Upon solidification, the test organism was streaked/ stabbed into the media and incubated at 37˚C for 48 hours. Obligates aerobes grew on the surface of the media; growth through the media indicated the facultative anaerobic organisms and bottom growth indicated anaerobic species.

Starch Hydrolysis Test

Nutrient agar impregnated with 0.3% soluble starch was prepared, homogenized and poured into sterile petri dishes to solidify. Each isolate was then discretely streaked on the solidified medium and incubated at 37˚C for 48hours after which they were flooded with 5-10ml Iodine. Blue-black coloration indicated a positive result.

Voges Proskauer Test

This test is used to differentiate *Bacillus* sp. and enteric bacteria which ferment glucose with the production of acetoin which can be detected by oxidation reaction. 2 ml of sterile Methyl red-Voges Proskauer broth was inoculated with test organism and incubated at 37 ^{0} C for 24 hours. A small amount of 10 % alpha-naphthol was added and then mixed. About 3 ml KOH was added and shaken. The set up was then left for an hour at room temperature. A pink to red colour indicated a positive result (Omomowo *et al.*, 2015).

Methyl Red Test

The test is used to check acid production in the medium usually for coliform organisms which ferment dextrose rapidly causing a fall in the pH. Methyl red-Voges Proskauer broth was prepared. 10 ml

of the broth was dispensed into test tubes and sterilized. Inoculation was subsequently done and incubated at 30 ^{0} C for 24 hours. After incubation a few drop of methyl red indicator was added to the culture and a resultant red colouration indicated a positive reaction (Omomowo *et al*., 2015).

Antibiotics Susceptibility Test

20ml of Mueller-Hinton agar was dispensed into sterile Petri-dish. After solidification of the agar, the inoculums were then streaked on the plates with aid of sterile inoculating loop. The plate were left to dry for few minutes. The antibiotics disks were placed on the plate using sterile forceps. The broad spectrum antibiotics disks that were used are: Amoxicillin, Penicillin, Ciproflovacin and Cephalosporin. The disks were then pressed down firmly with the aid of sterile forceps to ensure proper contact. The plates were then incubated at 37ºC for 24hours.

RESULTS

The results of the microbial analysis of vended fruit samples consisting of sliced watermelon, Pineapple and Pawpaw bought from different fruit vendors in Ilorin market, are presented in the following tables. Fifteen isolates were obtained from the vended fruit samples. The isolates were given the symbol PP = Pawpaw (PP_1, PP_2, PP_3, PP_4 and PP_5), PI = Pineapple (PI_1, PI_2, PI_3, PI_4 and PI_5) and WM = Watermelon (WM_1, WM_2, WM_3, WM_4 and WM_5). Table 1 shows the total viable count of the microorganisms colony in CFU/ml isolated from the fruit samples. Table 2 shows morphology and biochemical characterization of the microbial isolates from the ready-to-eat vended fruits. Table 3 shows the frequency of occurrence of the total viable count of the organisms isolated from vended fruits samples. Table 4 shows the zone of inhibition of the antibiotics test against *Salmonella* and *Shigella*.

Table 1: Total viable count of the organisms isolated (CFU/ml)

Pawpaw (PP) ($x10^4$ CFU/ml)	Pineapple (PI) ($x10^4$ CFU/ml)	Watermelon (WM) ($x10^4$CFU/ml)
25.00 ± 3.00	5.00 ± 0.00	24.50 ± 2.50

8.50 ± 1.50	13.00 ± 2.00	18.50 ± 1.50
9.50 ± 0.50	1.50± 0.50	3.00 ± 2.00
22.50 ± 3.50	3.50 ± 0.50	8.00 ± 2.00
6.50 ± 1.50	11.00 ± 2.00	2.00 ± 0.00

Table 2: Morphology and Biochemical Characterization of the microbial isolates from the ready-to-eat vended fruits

Vended Fruit samples	**Cellular Morphology**			**Biochemical Tests**								**Carbohydrate Fermentation**				**Morphological Characteristics**	**Probable Organisms**
	Gram's	Shape	Arrangement	Catalase	Coagulase	Indole	Methyl Red	Voges	Citrate	Oxidase	Oxygen Relationship	Fructose	Lactose	Maltose	Glucose		
PP_1	-	Rod	Single	+	-	-	+	-	+	-	Anaerobe	-	-	+	+	Pale white with black edges	*Salmonella species*
PP_2	-	Rod	single	+	+	-	-	+	+	+	F. anaerobe	-	-	+	-	Yellow-green	*Pseudomonas species*
PP_3	-	Rod	single	+	-	+	+	-	-	-	Anaerobe	+	+	+	+	Pink	*Escherichia coli*
PP_4	+	co	Gr	+	-	+	+	+	-	+	Anaer	-	+	+	+	Yellow	*Staphylococcus*

		cci	oup								obe						*aureus*
PP_5																Cottony dark-grey branched with round sporangiospores	*Mucor species*
PI_1	-	Rod	Single	+	-	+	+	-	-	-	Anaerobe	+	+	+	+	Pink	*Escherichia coli*
PI_2	-	Rod	Single	+	-	-	+	-	-	-	Anaerobe	-	-	+	+	Pale white with black edges	*Salmonella species*
PI_3	+	cocci	Group	+	-	+	+	+	-	+	Anaerobe	-	+	+	+	Yellow	*Staphylococcus aureus*
PI_4	-	Rod	single	+	-	-	+	-	-	-	Anaerobe	-	-	+	+	Pale white	*Shigella species*
PI_5																Cottony dark-grey branched with round sporangiospore	*Mucor species*
WM_1	-	Rod	Single	+	-	+	+	-	-	-	Anaerobe	-	+	+	+	Pink	*Escherichiacoli*
WM_2	-	Rod	single	+	-	-	+	-	-	-	Anaerobe	-	-	+	+	Pale white with black edges	*Salmonella species*
WM_3	+	cocci	Group	+	+	+	+	+	+	-	Anaerobe	-	+	+	+	Yellow	*Staphylococcus aureus*
WM_4	-	Rod	Single	+	-	-	+	-	-	-	Anaerobe	-	-	+	+	Pale white	*Shigella species*
WM_5																Cottony dark-grey branched with round	*Mucor species*

	sporangios pore

Table 3: Frequency of Occurrence of the total viable count of the organisms isolated from vended fruits samples

Vended fruit samples	Organisms	Frequency	%Occurrence
PP_1	*Salmonella* species	40	8.82
PP_2	*Pseudomonas* species	10	2.20
PP_3	*Escherichia coli*	10	2.20
PP_4	*Staphylococcus aureus*	50	11.01
PP_5	*Mucor* species	30	6.61
PI_1	*Escherichia coli*	16	3.52
PI_2	*Salmonella* species	38	8.37
PI_3	*Staphylococcus aureus*	26	5.73
PI_4	*Shigella* species	10	2.20
PI_5	*Mucor* species	30	6.61
WM_1	*Escherichia coli*	60	13.22
WM_2	*Salmonella* species	40	8.81
WM_3	*Staphylococcus aureus*	40	8.81
WM_4	*Shigella* species	14	3.08
WM_5	*Mucor* species	40	8.81
Total	15	454	100

Key:

PP=Pawpaw, PI=Pineapple, WM=Watermelon

Table 4: Zone of inhibition of the antibiotics test against *Salmonella* and *Shigella*

Isolates	**Antibiotics zone of inhibition (cm)**			
	Amoxicillin	Penicillin	Ciproflovacin	Cephalosporin
***Salmonella* spp.**	3	2.5	R	2

***Salmonella* spp.**	R	R	R	R
***Salmonella* spp.**	3	5	1	2.5
***Salmonella* spp.**	2.5	4	1	1.5
***Salmonella* spp.**	1.5	1	R	1
***Salmonella* spp.**	1	2.5	1.5	1.5
***Salmonella* spp.**	0.8	1.5	1.3	1
***Salmonella* spp.**	R	R	R	R
***Shigella* spp.**	3	R	1	2
***Shigella* spp.**	R	4	R	R
***Shigella* spp.**	2	R	1	1
***Shigella* spp.**	1	1	R	R
***Shigella* spp.**	R	2	1	R
***Shigella* spp.**	0.5	2.8	1.5	0.4
***Shigella* spp.**	5	3	1	R

Key:

R = Resistance (No zone of inhibition)

DISCUSSION

Bacteria and fungi are the common contaminants of our fruits and they could be easily transferred from the vendors to the processed fruits through mishandling. The consumption of ready-to-eat fruits directly from street vendors or hawkers potentially increase the risk of food-borne diseases caused by a wide variety of pathogens, because it is difficult to attest to the hygiene of these vendors or to the sanitary conditions at points of processing as well as the packaging materials. This could pose a threat to human health and this helps to throw light to the microbial contamination of ready-to-eat vended fruits that were bought from different fruit vendors in Ilorin market.

These micro-organisms isolated were *Escherichia coli* (13.22%), *Salmonella* sp (8.81%), *Pseudomonas* sp (2.20%), *Staphylococcus aureus* (11.01%), *Shigella* sp (3.08%) and *Mucor* sp (8.81%).

All the microbial isolates apart from *Shigella* sp was reported in the work of Odebisi-Omokanye *et al*., (2015) in the microbial quality of pre-cut fruits sold in Ilorin, Kwara state; Jolaoso *et al*., (2010) isolated *Staphylococcus aureus*, *Salmonella* sp and *Escherichia coli* from sliced pineapple and paw-paw. This is further supported by the work of Oranusi and Olorunfemi, (2011) that isolated *Staphylococcus aureus*, *Pseudomonas* sp, *Salmonella* sp and *Escherichia coli* from ready-to-eat fruits sold in Otta, Ogun state; Tambeker *et al*., (2009) also isolated *Staphylococcus aureus*, *Pseudomonas* sp, *Salmonella* sp and *Escherichia coli* from street vended fruits juices in Amravati, India. Moreover, the result of this study is in line with the report of Fowoyo, (2012) from air-contaminated vended foods sold in Lokoja, Kogi state.

Most of the isolates in this study may have been introduced into these fruits through faecally polluted water used in washing utensils like knives, trays and polyethene bags used for the packaging of the fruits after slicing or cutting and also exposure of these fruits to low temperatures which encourage the microbial growth of these pathogens (Daniyan and Ajibo, 2011). The presence of *Staphylococcus aureus*, *Pseudomonas* sp, *Salmonella* sp and *Escherichia coli* was in line with the work of Odebisi-Omokanye *et al.,* (2015) from pre-cut fruits sold in Ilorin. *Staphylococcus aureus*, *Salmonella* sp, *Shigella* sp, *Pseudomonas* sp and *Escherichia coli* are environmental isolates and they have been isolated from plants, human skin, animal and dairy products. Their presence in these ready-to-eat fruits may have been through unclean hands of the vendors, contact with sewage and contaminated water (De Roever, 1998). This implies that the fruit samples could serve as a vehicle in the transmission of these pathogens to the consumers of these contaminated fruits.

The presence of *Staphylococcus aureus* may have been introduced into the ready-to-eat fruits through body contact of vendors with the fruits because the organism is a normal flora of the nasal passage, hands and skins of healthy individuals (Nester *et al.,* (2006). Odebisi-Omokanye *et al.,* (2015) and Ganguli, (2006) reported *Staphylococcus aureus* to have the highest occurrence in fruits and foods respectively. It was recorded to be the second highest occurring isolate with the frequency of occurrence of (11.01%) in Pawpaw. Aboloma, (2008) and WadaKura *et al*., (2009) have also reported that the incidence of *Staphylococcus aureus* in food is an indication of environmental and human contamination.

This high incidence may have occurred due to the use of polyethene bags for the packaging of these fruits after slicing or cutting them (Little and Mitchell, 2004).

In this study, *Mucor* sp, *Salmonella* sp and *Staphylococcus aureus* had the same incidence of (8.81%). Oviasogie *et al.,* (2015) reported such incidence of *Mucor* sp in the assessment of fungal pathogens associated with orange spoilage sold in Benin, Edo state while Oluwatoyin *et al.,* (2015) reported such high incidence in *Salmonella* sp and *Staphylococcus aureus* in assessment of the microbial safety of polyethylene packaged sliced fruits sold in Abeokuta, Ogun state. The presence of *Mucor* sp promotes the contamination and because they are ubiquitous they can be found on fresh vegetables, fruits and other substances that give nutrients. They are also able to withstand high concentration of sugar and they can survive in the absence of water or moisture. Such high occurrence may have occurred as a result of the exposure of these ready-to-eat fruits to dusty or muddy areas. Most of these fruit vendors stay near stagnant water of gutters which may serve as an entry for fruit contamination. Frank and Warribor, (2006) reported that the microbial load on leafy vegetables and fruits increase with time during storage. When these fruits are stored at inappropriate temperatures, they tend to attain temperatures that are suitable for the microbial growth of these pathogens to cause diseases when ingested (Bryan *et al.,* 1992).

The results show that *Escherichia coli* had the highest frequency of occurrence of (13.22%) and it conforms to the report by Daniyan and Ajibo, (2011) and Daniel *et al.,* (2014) in sliced fresh fruits sold in Minna and Bida metropolis respectively. *Escherichia coli* is regarded as primary indicator for microbiological quality of food and water and this shows that these fruits are not safe for human consumption. According to CDC, (2011), the main transmission of *Escherichia coli* was through faecally contaminated food or water. The high occurrence may have occurred in the contact of contaminated water with the fruits during washing of the fruits and also the inadequate washing of hands by the fruit vendors (Tambekar *et al.,* 2007).

Some of these fruit vendors get their water from unclean sources like dirty streams and also they could use very little quantity of water to wash or rinse all the fruits. The low occurrence of *Pseudomonas* sp and *Shigella* sp was also reported by Fowoyo, (2012) in the assessment of air contaminated vended foods sold in Lokoja, Kogi state. These ready-to-eat fruits may get contaminated from knives used for

cutting or slicing, improper human handling and processing, tables or trays used during peeling and cutting, rinsed water, washing buckets and packaging materials as these fruits are cut, washed, wrapped with transparent polyethene bags and sold to the consumers. The presence of these possible pathogens in the analysed fruit samples should be of great importance to the vendors, consumers and concerned arms of government.

The pathogenic organisms isolated (*Salmonella spp* and *Shigella spp*) were tested against antibiotics: Amoxillin, Penicillin, Ciproflovacin and Cephalosporin, (Table 4), which *Salmonella* sp was resistant to (four antibiotics) Amoxillin, Penicillin, Ciproflovacin and Cephalosporin. *Streptococcus* sp was sensitive to (gentamycin and ciprofloxacin) but resistance to amoxillin, augm. *Shigella* sp was resistance to one antibiotics (Cephalosporin) but sensitive to other antibiotics used in this study.

Conclusion

In conclusion, the result from this study has shown that poor hygiene of the vendors and environmental factors could cause the microbial contamination of these processed vended fruits sold in Ilorin market. From time to time, government health officials should give attention to the market especially these fruit vendors, at least to put on check how these vended fruits are processed which includes the type and source of water used, the condition of the utensils and most especially the personal hygiene of the fruit vendor to reduce help the rate of vended fruit contamination. Public awareness programs can also be used as a measure to educate these fruit vendors on personal and environmental hygiene to reduce contamination.

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