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The Impact of Street-Vended Bean Cake on Residents in Makurdi Town, Nigeria

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Abstract: With the rate of urbanization in third-world cities, street-vended foods play a vital role in providing many urban residents with cheap, nutritious, and accessible food regardless of its safety, quality, and hygiene. This study assessed the impact of street-vended bean cake on residents in Makurdi town, Nigeria, which covered two council wards, namely North-Bank Ward I and North-Bank Ward II. A sample of 30 street-vended bean cakes was collected from vendors in 10 locations within Makurdi town for laboratory analysis. Miles and Misra's technique was performed in triplicate to determine the total bacterial counts. The vendor's socioeconomic characteristics, cleanliness, and bean cake security were assessed. The bean cake vendors are between the age group 26 - 35 years. Most vendors have completed primary school and earn ₦11,000 - ₦25,000 monthly from bean cake vending. Although 66.7 % of bean cake street vendors wear a neat apron and trim their nails short, however, 73.3 % serve their customers with bare hands, which implies a high possibility of bean cake contamination. It also implied that vendor's hygiene factors and improper handling of bean cake can cumulatively affect the quality of bean cake available to Makurdi residents and could lead to loss of man-hour productivity. Four bacterial pathogens were identified in the study area; Bacillus spp. had the highest percentage (33.33 %), closely followed by Staphylococcus aureus (30.00%), Proteus spp. (20.00 %), while E. Coli maintained the least with (16.67%). The presence of Bacillus spp., Staphylococcus aureus, Proteus spp., and E. Coli implied a threat to human health. The study recommended proactive measures to be taken to forestall food-borne diseases, public awareness campaigns on food hygiene, and routine inspection of street bean cake vending locations.

Keywords: *Bacterial pathogens, Bean cake, Food safety, Makurdi, Unregulated environment*

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1. Introduction

Street vended bean cake, commonly called "Akara," can be described as the food consumed or eaten on the spot where it has been prepared. Bean cake vending is quite common and well-accepted in most developing countries like Nigeria. Street vended bean cake foods are not only edible but also reasonably priced low in every country and attractive to local inhabitants, and tourists. In addition, street vended bean cake food is enjoyed by all age groups and classes of people. The street vended bean cake is a ready-to-consume food that is promptly served when cooked and is attractive to the buyers. Economically, street vended bean cake has become increasingly important in the economy of African countries. It helps to sustain many families to meet their financial obligations, tax-based to municipal authorities and an informal sector that contributes to national economic development. Considering the high prices of packaged foods in supermarkets, street foods like bean cakes seem to be a viable option for low-income owners in urban areas. Consumption of street food, particularly bean cake, is common in many African countries where the unemployment level is high, salaries are low, social programs are limited, and the rate of urbanization is very high in cities.

It has been observed that some people patronize street bean cake vendors because of their convenience regardless of their safety, quality, and hygiene. The street bean cake provides a source of affordable nutrients to the majority of people especially the low-earning group in developing countries (Mohamed et al., 2018). Acacio et al., (2021) estimated that 2.5 billion people worldwide consume street food daily. However, health risks are associated with the street vended bean cake as a high number of microorganisms multiplies fast due to improper handling of the vended bean cake and the use of stained or dirty utensils.

Birgen et al. (2020) noted that street-vended foods play a vital role in providing many urban residents with cheap, nutritious, and accessible food, but when prepared in an unhygienic and unregulated environment, they could contribute to an increased food safety burden. The scholars further reported that food safety problems pose a great threat to the health of consumers with the greatest burden in developing countries. According to Adley and Ryan (2016), food poisoning also referred to as foodborne illness or foodborne disease is any sickness that results from consuming food contaminated with microbes or their toxins. Mohamed et al. (2018) noted that food-borne bacterial pathogens commonly detected in street vended foods cause diseases. For example, Bacillus cereus causes vomiting and diarrhoea. Staphylococcus spp. causes vomiting, diarrhoea, loss of appetite, severe abdominal cramps and mild fever, while Salmonella species causes typhoid, food poisoning and inflammation in the gastrointestinal tract.

The preparation, processing and vending procedures of street bean cake consequently have effects on its microbiological quality. In general, contamination can be introduced in street vended bean cake food in several ways; the nature of water utilised for cooking, dirty serving vessels, cleanliness of the vendor and the filthy operating environment are the major causes contributing to food poisoning. However, street vended bean cake food being the essential feeding source for a large number of people including travellers, labourers, shopkeepers and students offered at reasonably low prices and easy access, the significance of street vended bean cake food to society cannot be over-emphasised (Chauhan et al., 2015).

In recent years, major cities in Nigeria, including Makurdi town, have experienced a significant increase in urbanization due to migrations from rural to urban areas for various reasons like the search for white-collar jobs, schooling, and seeking refuge due to persistent farmer-herder crisis in rural areas has increased the rate of urbanization in the town. Therefore, it has become necessary to conduct a similar study in Makurdi town to ascertain the quality of bean cakes sold to consumers in the area.

This study aimed to assess the impacts of street-vended bean cake on residents in Makurdi town, Nigeria with the following objectives that include to:

a. To examine the vendor's personal cleanliness
b. To assess the bacteriological quality of street vended bean cake on residents in Makurdi town

This study focused on assessing the impacts of street vended bean cake on residents in Makurdi town, Nigeria. Examination of the environmental condition of vendor's premises and bacteriological quality of street vended bean cake in Makurdi town will help concerned authorities to take appropriate steps in improving food safety within the town. The study would further be a resource for food safety education for food handlers and consumers.

2. Relevant Literatures

Many studies have reported on vended street foods as a real public health safety concern because food vendors prepare and dispense their finished products in open places where they are bound to face difficulties like poor hygiene, unavailability of clean water, use of inferior raw materials, lack of appropriate equipment, poor sanitation conditions, improper food processing and packaging techniques, absence of suitable storage facilities and waste disposal places. Consequently, inappropriate treatment of street vended food is the major source of food contamination. In general, food is an excellent medium for microbes to flourish and multiply their number quickly. Similarly, vended bean cake made up of protein is a potential vehicle for food-borne microorganisms.

Rane (2011) reported that food sold by street vendors is the major source of food-borne illness. Although food items from these outlets are appreciated mostly for their unique flavour and their convenience, their microbiological safety is not always guaranteed. Food contact surfaces are a major concern for food service facilities in controlling the spread of food-borne pathogens, surfaces like bench tops and tables. These may have bacteria on them due to contact with people, raw foods, dirty equipment, or other things like cartons that have been stored on the floor.

Madueke et al. (2014) sampled street foods like fried yam, fried potato, fried plantain, akara, fish, and suya retailed in two locations along Lokoja-Abuja express road and analyzed for their microbial load. The samples were analyzed for bacteria and fungi using standard procedures. Analysis of the food samples revealed a mean total bacterial count ranging from 5.0 x 104cfu/g (akara) to 2.08 x 107cfu/g (fish). Mean coliform count ranged from 5.0 x 104cfu/g (yam) to1.0 x 107cfu/g (suya), and fungal count ranged from 1.5 x 105cfu/g (yam) to 6.0 x 105cfu/g (fish). The organisms encountered included: *Bacillus cereus, Staphylococcus aureus, Streptococcus sp., Enterobacter sp, Escherichia coli, Shigella dysenteriae, Klebsiella, Pseudomonas, Micrococcus, Flavobacterium, Mucor, Penicillium sp., Aspergillus niger, Aspergillus flavus, Fusarium sp.* and *Rhizopus stolonifer.* The coliform counts were high (≥ 105) in most of the samples;

this can be due to post-production contamination as the entire food samples involved the use of heat during manufacturing.

Madueke et al., (2014) concluded that most food pathogens are transmitted through poor food preparation, personal hygiene or poor public sanitation practices. Chauhan et al., (2015) affirmed that improper personal hygiene can facilitate the transmission of the pathogenic bacteria found in the environment and on peoples' hands through food to humans. The scholars conducted a microbial screening study to investigate the microbiological quality of street food in Dehradun, India. Pour plate technique and biochemical characterization were performed, and the results showed the presence of a considerable number of microorganisms, which led to several food-borne infections.

3. Materials and methods

Makurdi town serves dual functions as the Benue State capital and the headquarters of Makurdi Local Government, and it is located in the north-central region of Nigeria. Makurdi town is physically divided by the Benue River into Makurdi north and south, while Makurdi Local Government is divided into nine council wards. The study area covered two council wards namely North Bank Ward I and North Bank Ward II. Bean cake vendors in Makurdi town (north) were listed as comprised of 64 street bean cake vending sites for study. A pilot survey was conducted in Wadata council ward Makurdi south (outside the study area) which had 52 street bean cake vending sites. The pilot study aimed at testing the validity and reliability of research instruments

. A correlational test method was used to assess the validity and reliability of research instruments, and the instrument yielded high correlation coefficients proving that the questions could be used to collect data. A closed-ended questionnaire was designed to analyze the bean cake vendor's cleanliness, knowledge of food safety standards, and related health risks. The survey was comprised of basic questions, including vendor's socioeconomic status, individual's cleanliness, and bean cake security.

Food safety practices of all the vendors on the streets were assessed using a checklist that was adapted from checklists used by previous researchers (Birgen et al, 2020). The demographic data included location, sex, educational level, age, and occupation. The hygienic practices were evaluated using "yes" or "no" which were then expressed in proportions. The participants for the study were randomly selected in the study area as indicated in Figure 1. Ethical issues were considered for this study as prior consent was sought, and the intent was elaborated to respondents, after which the volunteers signed the consent form and filled in the questionnaire.

A sample size of 30 street-vended bean cake vendors was used for the study. Structure questionnaires were administered to the 30 selected street-vended bean cake vendors, and a 100 per cent return questionnaire was recorded. Three samples of street vended bean cake were aseptically collected from each of the 10 vending sites, which amounted to 30 samples in Makurdi North, and were transported in a sterilised container for laboratory analysis. Food samples were processed in time as soon as the sample arrived between 2 - 4 hours in Joseph Sarwuan Tarka University laboratory.

3.1. Isolation and enumeration of total viable count

1 gm/ml of food sample was homogenized in 99 ml of maximum recovery diluent, and the beaker was left to stand for 15 - 20 minutes. Tenfold serial dilutions were prepared by adding 1 ml homogenized sample in 9 ml distilled water up to 10-6 dilutions. From the last three dilutions (10-4, 10-5, 10-6), Miles and Misra's technique was performed in triplicate to determine the total number of bacterial counts (Ssemakalu et al., 2020). From each dilution, six drops of 20 µl were positioned on Mueller Hinton agar plates. Inoculated plates were left undisturbed until the drops were properly absorbed. Then plates were incubated overnight at 37ºC. Colonies were counted and tabulated after the incubation period.

3.2. Enrichment and identification of bacteria

An enrichment technique was used for the isolation of bacteria belonging to the Enterobacteriaceae family for which Lactose broth and Mossel's broth were used. After selective enrichment, inoculation was done from Lactose and Mossel's broth to selective media including MacConkey's agar, Salmonella Shigella agar, Deoxycholate Citrate agar, and Eosin Methylene Blue agar. Discrete colonies on selective media after incubation were inspected macroscopically and then biochemical tests were performed for further identification according to Bergey's manual of determinative biology.

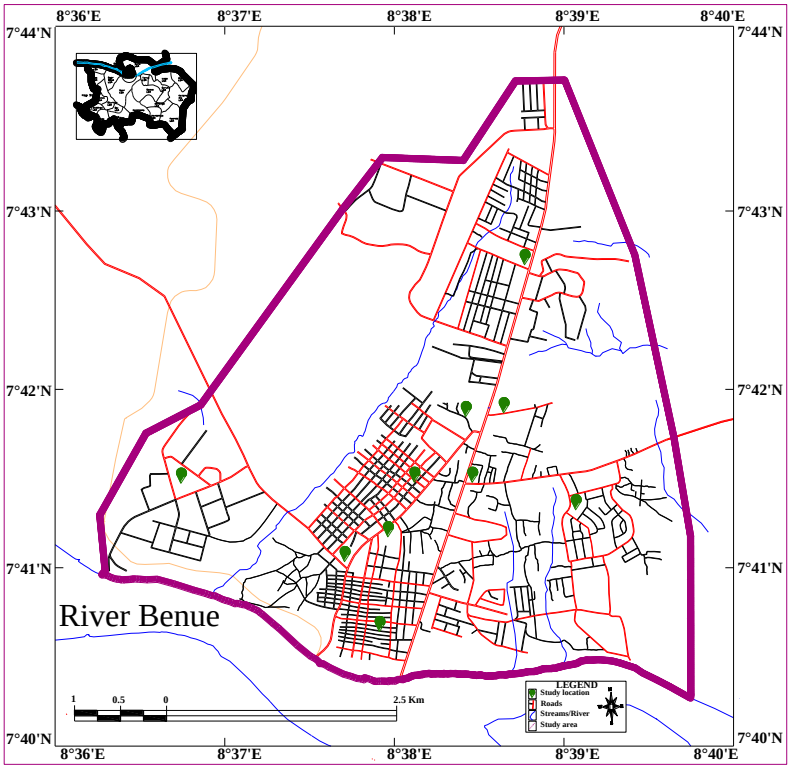

Figure 1: Map of Makurdi North Showing Study Locations
Source: Ministry of Lands, Survey and Solid Minerals

4. Results

4.1. Microbial survey

Data concerning the Vendor's socioeconomic status and food safety was gathered through a structured survey of street bean cake vendors. The survey was based on assessing vendor cleanliness practices and awareness of food-related health risks.

A total number of 30 bean cake samples were analysed for a total viable count of microorganisms obtained from randomly selected 30 street vendors at 10 vending locations in North Bank wards I and II. The samples were labelled A1-3, B1-3 until J3, respectively, according to the 3 sellers per vending site for easy identification and were analysed after culturing on plate count agar NA) at 37°c for 24 hrs. After which the total number of colonies were counted and recorded. The number of colonies was counted per sample, multiplied by the dilution factor plated, and divided by the volume of diluent, as shown in Equation 1.

$$\frac{\text{No.of colonies} \times \text{dilution factor}}{\text{vol.of diluent}} \text{ (expressed in CFU/g)} \qquad \text{Equation 1}$$

4.2. Characteristics of bean cake vendors

The personal characteristics of bean cake vendors were assessed as presented in Table 1.

Table 1 shows that 12 bean cake street vendors are between the age group 26 - 35 years representing 40 % of the study population. It shows that all the 30 sampled bean cake street vendors are female, which means bean cake in Makurdi town is being sold by women; 9 (30.00%) of bean cake street vendors are divorced ladies who resort to selling bean cake to earn a living. While 17 of the bean cake street vendors (56.7 %) have completed primary school and 14 of the bean cake street vendors (46.7 %) earn ₦11,000 - ₦25,000 monthly.

Table 1: Socio-economic Characteristics of Bean Cake Vendors

Age of Food Vendor	Frequency	Per cent
8 - 25 years	8	26.7
26 - 35 years	12	40.0

36 - 45 years	4	13.3
46 - 55 years	6	20.0
Sex		
Female	30	100.0
Marital Status		
Single	7	23.3
Married	6	20.0
Separated	2	6.7
Divorced	9	30.0
Widowed	6	20.0
Level of Education		
No formal education	10	33.3
Prim. school Completed	17	56.7
Sec. school Completed	3	10.0
Vendor's Monthly Income		
₦10,000 or less	9	30.0
₦11,000 - ₦25,000	14	46.7
₦26,000 - ₦75,000	6	20.0
₦76,000 - ₦100,000	1	3.3

Source Field work, 2023

Table 2 illustrates vendors' individual cleanliness and bean cake security It shows that 20 (66.7 %) bean cake street vendors wear neat clothes. The majority 17 (56.7 %) of bean cake street vendors trim their nails short, while 22 (73.3 %) of bean cake street vendors serve their customers with bare hands. The majority (63.3 %) of bean cake street vendors do not cover their food after preparation. Although 18 (60.0 %) of bean cake street vendors use clean utensils to serve their customers, 27 (90.0 %) of bean cake street vendors do not use running water to clean their utensils and 18 (60.0 %) of bean cake street vendors do not provide wash hand basin for customers. Similarly, 16 (53.3 %) of bean cake street vendors do not maintain clean premises and 20 (66.7 %) of bean cake street vendors do not provide litter bins within their premises.

Table 2: Vendors individual's cleanliness and bean cake security

Wear Neat Clothes	Frequency	Per cent
Yes	20	66.7
No	10	33.3
Trim Short Nails		
Yes	17	56.7
No	13	43.3
Use Bare Hands		
Yes	22	73.3
No	8	26.7
Food Covered		
Yes	11	36.7
No	19	63.3
Use Clean Utensils		
Yes	18	60.0
No	12	40.0
Use Running Water		
Yes	3	10.0
No	27	90.0
Provide Wash hand Basin		
Yes	12	40.0
No	18	60.0
Maintain Premises Clean		
Yes	14	46.7
No	16	53.3
Provide Litter Bin		
Yes	10	33.3
No	20	66.7

Source Field work, 2023

4.3. Total viable count

The mean bacterial count of the isolates found in street vended bean cake was expressed as log cfu/g (mL). The total bacterial count of the isolates was considered for each sample and tabulated as in Figure 2.

Location	A			B			C			D			E			F			G			H			I			J		
Sample	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Vendor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Colony count	2.3 x 10^6	7.0 x 10^6	3.2 x 10^6	5.0 x 10^6	5.0 x 10^6	3.2 x 10^6	6.0 x 10^6	5.6 x 10^6	6.0 x 10^6	5.3 x 10^6	3.9 x 10^6	1.2 x 10^6	1.2 x 10^6	6.2 x 10^6	3.6 x 10^6	2.9 x 10^6	4.3 x 10^6	5.6 x 10^6	3.4 x 10^6	5.2 x 10^6	2.6 x 10^6	5.5 x 10^6	5.4 x 10^6	4.3 x 10^6	5.7 x 10^6	4.4 x 10^6	1.2 x 10^6	5.0 x 10^6	3.1 x 10^6	5.05 x 10^6
Gram Reaction	+	+	+	+	–	–	–	–	+	+	+	–	–	+	–	–	+	+	+	+	+	–	+	+	+	+	+	+	+	+
Colour of cells	ppl	ppl	ppl	ppl	pk	pk	pk	pk	ppl	ppl	ppl	pk	pk	ppl	ppl	pk	ppl	ppl	ppl	ppl	ppl	pk	ppl	ppl	ppl	ppl	ppl	ppl	ppl	pk
Shape of cells	cc	rd	rd	rd	rd	rd	rd	rd	cc	cc	cc	rd	rd	cc	rd	rd	cc	rd	rd	rd	cc	rd	cc	rd	rd	rd	rd	rd	cc	rd
H2S	–	–	–	–	–	+	+	–	–	–	–	–	–	–	+	+	–	–	–	–	–	–	–	–	+	+	+	+	+	+
Catalse	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	–	–	–	–	–	–
Motility	–	+	+	+	+	+	+	+	–	–	–	+	+	–	+	+	–	+	+	+	–	+	–	+	+	+	+	+	+	+
Coagulase	+	–	–	–	–	–	–	–	+	+	+	–	–	+	–	–	+	–	–	–	+	–	+	–	–	+	+	+	–	–
Citrate	+	+	+	+	–	+	+	–	+	+	+	–	–	+	+	+	+	+	+	+	+	–	+	+	+	–	–	–	+	+
Urease	+	–	–	–	–	+	+	–	+	+	+	+	+	+	+	+	+	–	–	–	+	+	+	–	+	+	+	+	+	+
Indole	–	–	–	–	+	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	+
Glucose	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	–	–	–	–	–
Sucrose	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Staphylococcus spp.	Bacillus spp.	Bacillus spp.	Bacillus spp.	E. Coli	Proteus spp.	Proteus spp.	E. Coli	Staphyloloccus spp.	Staphyloloccus spp.	Staphyloloccus spp.	E. Coli	E. Coli	Staphyloloccus spp.	Proteus spp.	Proteus spp.	Staphyloloccus spp.	Bacillus spp.	Bacillus spp.	Bacillus spp.	Staphyloloccus spp.	E. Coli	Staphyloloccus spp.	Bacillus spp.	Proteus spp.	Bacillus spp.	Bacillus spp.	Bacillus spp.	Staphyloloccus spp.	Proteus spp.

KEY
ppl = purple
pk = pink
rd = rods
cc = cocci
A = Opp. Good news
B = Mosque Hq.
C = North Bank V. mkt
D = NASME road
E = Supas club
F = Mechanic site
G = Behind Access Bank
H = Lafia garrage
I = SRS junction
J = Ter Guma street

Figure 2: Bacterial Count on Street Vended Bean Cake in Makurdi Town
Source Field work, 2023

Table 3 shows that among the four bacterial pathogens identified in the study area, Bacillus spp. had the highest percentage (33.33 %) and was closely followed by Staphylococcus aureus (30.00%) while E. Coli maintained the lowest with (16.67%).

Table 3: Bacterial Pathogens Occurrence by Percentage

S.N.	Bacterial Patogens	Per cent (%)
1	Bacillus spp	33.33
2	Staphylococcus aureus	30.00
3	Proteus spp.	20.00
4	E. Coli	16.67
	TOTAL	100.00

Source: Fieldwork, 2023

Table 4 indicates that opposite Good News, NASME road, behind the Access bank and SRS junction, there were fewer bacterial pathogens in the study area.

Table 4: Location of Bacterial Pathogens Occurrence Identified

S.N.	**Symbol**	**Name of Location**	**Bacterial Pathogen Identified**
1	A	Opp. Good News	Staphlococcus aureus, Bacillus cereus.
2	B	Mosque Hqtrs.	Bacillus cereus, E. Coli, Proteus.
3	C	North Bank V. Mkt	Proteus, E.Coli, Staphlococcus aureus.
4	D	NASME Road	Staphlococcus aureus, E.Coli.
5	E	Supas club	E.Coli, Staphlococcus aureus, Proteus.
6	F	Mechanic site	Proteus, Staphlococcus aureus, Bacillus cereus.
7	G	Behind Access Bank	Bacillus cereus, Staphlococcus aureus.
8	H	Lafia Garrage	E.Coli, Staphlococcus aureus, Bacillus cereus.
9	I	SRS junction	Proteus, Bacillus cereus.
10	J	Ter Guma street	Bacillus cereus, Staphlococcus aureus, Proteus.

Source: Fieldwork, 2023

5. Discussion

The study shows that vendors wear neat clothes. The majority trim their nails short, while some vendors serve their customers with bare hands. Although street bean cake vendors try to maintain food personal hygiene, some vendors serve their customers with bare hands which implied that the safety of the street bean cake sold to customers is not guaranteed. Most bean cake street vendors do not cover their food after preparation and this could be a potential source of food contamination of bacterial pathogens identified in 10 vending sites. This study is in harmony with Temesgenet al. (2016) study which identified foodborne bacteria isolates that posed public health problems in Hawassa, Ethiopia locality.

Nevertheless, street bean cake vendors in Makurdi North use clean utensils to serve their customers, but some vendors still do not use running water to clean their utensils and do not provide wash hand basins for their customers. It implied a high possibility of bean cake contamination due to a lack of running water to clean their utensils. Our study is in agreement with Chauhan et al. (2015) who documented that improper personal hygiene can facilitate the transmission of the pathogenic bacteria found in the environment and on peoples' hands through food served to humans. It could further be inferred that the vendor's hygiene factors, together with improper handling of bean cake, can cumulatively affect the quality of bean cake available to Makurdi residents and could lead to loss of man-hour productivity of a locality. Similarly, some vendors neither maintain clean premises nor provide litter bins within their premises which could be a breeding place for flies and bean cake pathogens. This study agrees with Madueke et al. (2014) who recorded that most food pathogens are transmitted through poor food preparation, personal hygiene or poor public sanitation practices. Foodborne bacterial pathogens commonly detected in street vended bean cake in the study area include *Bacillus spp., Staphylococcus aureus, Proteus spp.,* and *E. Coli*. The presence of Bacillus spp., Staphylococcus aureus, Proteus spp. and E. Coli implied a threat to human health. This agrees with Birgen et al. (2020), who reported the presence of E. coli, Salmonella spp., and Staphylococcus aureus and Campylobacter jejuni in raw and cooked chicken.

Our findings on street-vended bean cakes in Makurdi town are similar to those of Temesgen et al. (2016), who demonstrated that street-vended foods sold on the streets of Hawassa, Ethiopia, were considerably contaminated due to a lack of training or orientation on the proper handling and processing of food, poor personal hygiene of vendors, and unhygienic surroundings in that locality.

6. Conclusion

The study concluded that street vended bean cake in Makurdi town constitutes a potential hazard to human health. A significant number of gastrointestinal pathogens were present in street bean cakes sold in North Bank, Makurdi. The contamination with Bacillus spp. has a greater percentage occurrence in the study area due to improper food handling, storage, and rapid cooling of bean cake, thereby promoting the growth or production of emetic toxin by the bacterium as some bacillus strains are thermophilic.

Staphylococcus aureus had a significant percentage occurrence revealing poor hygiene of vendors either during food processing or serving their customers. While Proteus spp and E.coli occurrence found to be capable of causing intestinal diseases. The isolation of bacteria belonging to the family Enterobacteriaceae in street-vended foods was a clear indication of a post-handling violation. The results indicated the presence of potentially threatening strains in street-vended bean cake could serve as a critical vehicle for transmitting resistant organisms to consumers daily. Accordingly, access to clean water and well-being instruction to the vendors on individual cleanliness, food security, and immediate transfer of waste would enhance the food quality and is of paramount importance to avert the trend.

The relevant authorities should take proactive measures to forestall food-borne incidences in the future. Routine microbiological testing in a random manner, endorsement of the surveillance of food-borne diseases, and the launch of risk assessment measures may specifically enhance the microbiological quality of street-vended foods as well as consumer safety. Public awareness campaigns on food hygiene are important, especially on the importance of food hazards, residual pesticide concentrations, and misuse of additives or colours and chemical contaminants.

Street bean cake vendors should be encouraged to form cooperative associations which could help their members secure loans from commercial banks to expand their businesses. Through cooperative societies, it would be easier for city managers and health authorities to monitor the activities of the organizations, and events of microbial outbreaks related to bean cake could be easily traced.

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