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MICROBIOLOGICAL AND HEAVY METAL ANALYSIS OF FRIES (POTATOES, SAUSAGE AND CHICKEN) VENDED WITHIN ADO-ODO-OTTA LOCAL GOVERNMECT AREA IN OGUN STATE

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ABSTRACT

This study aims to investigate the microbiological analysis and heavy metal content of fries (potato, chicken, and sausage) sold in the Ogun State. Foods that can be purchased from street sellers, hawkers, or local markets and consumed right away are referred to as ready to eat foods. These meals are easily contaminated by dust, exhaust smoke, sand, insects, and hands of prospective customers because they are frequently sold in the open and unprotected. The ready-to-eat fries samples (potatoes, chicken, and sausage) were bought from sellers from Igbesa, Sango, and Lusada in the vicinity of Ado Odo Otta in Ogun State. Samples were prepared, analyzed and biochemical tests were performed using the advised standard procedure. After being digested, samples of the fries were put into the apparatus (AAS) to find out whether heavy metals were present. Results revealed that coliform count, *Staphylococcus* count and SSBC ranges from $1.5x10^3$ to $8.8x10^3$cfu/g, $1.8x10^5$ to $5.5x10^5$cfu/g and $0.52x10^6$ to $2.8x10^6$cfu/g respectively. Four bacteria genera that include; *Bacillus subtilis*, *Escherichia coli*, *Salmonella typhimurium* and *Staphylococcus aureus* were isolated from the samples. Fungal isolates from the samples includes *Saccharomyces cerevisiae* , *Mucor spp* and *Fusarium spp*. Heavy metal analysis on the samples reveals that, Fe, Cu and Zn has a range of 2.454 to 3.421 mg, -0.036 to 0.0035 mg, and 0.240 to 0.081 mg respectively. These findings suggest that some of the food sampled pose health risk to customers. Sanitary and hygienic measures during processing and point of sale of these foods should be done.

Key words: Microbiological, Heavy metals, Fries, Ready to eat, Sanitary, hygienic**.**

Introduction

Foods are defined as ready to eat foods and beverages prepared and or sold by vendors and hawkers especially in streets and other similar public places (Dawson and Canet, 2011). Ready to eat foods are foods that can be purchased directly from street vendors or hawkers or at local

markets and eaten immediately. These offer readily available delicacies at a lower cost and are hugely popular all around the world. Street vendors prepare and/or sell food for immediate consumption or storage without further processing or preparation.

They do this on the street and in other public areas; Fried chicken, sausages, potatoes, yams, and other takeaway items are a few examples of ready-to-eat cuisine. Strict hygiene procedures must be followed throughout the whole processing chain while processing these value-added products. This is due to the fact that even under ideal management circumstances and methods, chicken meat and chicken-based products are sensitive to microbial deterioration and may include pathogens (WHO, 2010).

Since these foods are frequently sold in the open and unprotected, they are vulnerable to contamination. Street vendors frequently operate out of locations like bus terminals, industrial areas, schools, market places, and streets because they want to bring their goods directly to the clients. Typically, these places do not adhere to standards for food safety (WHO, 2010).

Fries (potato, hot dog, and chicken) are frequently sold in Igbesa town's busiest locations. In Igbesa, open markets along main streets and some fast food restaurants frequently sell fries. The manners in which they are handled and displayed for sale to the general public raise concerns about the products' level of sanitation. The products are put on open trays that can be easily contaminated by dirt, exhaust fumes, sand, insects, buyer hands, etc. Food-borne illnesses, according to Yah *et al*. (2016) are illnesses brought on by ingesting bacteria, toxins, or cells produced by microorganisms found in food. Food-borne illnesses can be brought on by *Escherichia. coli, Bacillus species, Clostridium botulinum*, molds, fungus, and yeast, among other organisms. Fried chicken sold on the streets and in some fast food restaurants has long been associated with negative health effects (Cencile *et al*., 2013).

When potentially dangerous chemicals, microbes, or other contaminants are found in food, it is referred to as food contamination. Food contaminants are compounds that are typically not introduced to food consciously but are nevertheless present in those foods as a result of environmental pollution or as a result of the processing, preparation, treatment, packaging, transport, or holding of such foods (Marsh and Bugusu, 2017; WHO, 2015). The health impacts of microbial contamination may become apparent in a matter of days or weeks, but the effects of chemical contamination may not become apparent for many months or years.

Metal contaminants including Pb, Cd, Zn, Hg, Mg, Mn, Cu, and Co are examples of chemical contaminants. Even while several of these metals (including Zn, Cu, Co, and Mn) are categorized as essential elements, when they are present in the body in amounts over a specific threshold, they can become hazardous and lead to a number of health issues. Even at very low or trace quantities, metals like Pb and Cd may exhibit toxicological issues since they have no known biological roles (Iwegbue, 2012; Elham-*Elshewey et al*., 2015). The health repercussions of metal poisoning can include gastrointestinal issues, tremor, diarrhoea, paralysis, vomiting, convulsion, diabetes, cancer, anemia, encelopathy, depending on the type of metal (Duruibe *et al*., 2017; Adefris, 2011; Dada *et al*., 2015).

From a health perspective, the sale of food on the street is highly debatable; the greatest health risk connected to street food is microbial contamination (Dawson and Canet, 2011). Numerous observational studies have demonstrated that street meals are sometimes kept at unsanitary temperatures, handled excessively by food vendors, and served in filthy environments, making them susceptible to infection (WHO, 2006). Additionally, the majority of the sellers either had little formal education or none at all, so they are not aware of how to handle food properly or how they contribute to the spread of infections. Knowing the microbiological quality of foods sold on the street helps people understand the safety issues with them so that they can take the necessary action to sanitize and increase safety in this industry's context. In order to determine the safety of the fries (potatoes, yams, sausage, and chicken) for human consumption, the study examined the microbiological and heavy metal analyses of these fries in the Ogun State metropolis.

METHODOLOGY

Collection of Sample

The sample of ready to eat fries (Potatos, hotdog and chicken) were purchased from Igbesa, Lusada and Sango town in Ado/Odo-Ota LGA in Ogun State. The samples were collected in a sterile plastic bags and and kept in a covered cooler and analyzed within 12 hours of collection.

Microbiological analysis

1g of fries sample was homogenized in 9ml of sterile distilled water. 1ml was pipetted from it and added to the next blank distilled water making a dilution of 10^{-2} dilutions were made by mixing 1.0ml of the homogenate in 9ml of sterile water to obtain 10^{-3} dilution, the dilution was then made to 10^{-4}, 10^{-5}, 10^{-6}, 10^{-7}. The total viable count of bacteria was determined by enumerating the colony forming units by pour plating 1.0ml of 10^{-3} and 10^{-5} diluents on nutrient agar plates and incubated at 37^{o}C for 24 hours.

The total fungal count were determined by pour plating on PDA agar plates and incubated at room temperature for 24 hours. Pure cultures of bacterial and parasitic isolates were gotten on nutrient and PDA agar plates individually.

Identification of Isolates

After the incubation period, the plates were read and observed for growth. were identified based on standard microbiological methods. Cultural characteristics and biochemical tests: indole, catalase, oxidase, motility, citrate utilization, and sugar fermentation test were carried out as a preliminary test. The populations of fungal isolates were identified on the taxonomic schemes and descriptions.

Determination of Heavy Metals

Preparation of Aqua Regia

Aqua regia is a mixture of concentration of HCl and HNO_3 in ratio 3:1 by adding measure 90ml of HCl, then add 30ml of HNO_3 together (90:30)

Procedure for Digestion of Sample

2g of each sample was weighing in to a digestion tube and 20ml of aqua regia was added to it and it was put on hot plate in a fume cupboard and heat for 30minutes. And allow cooling, after cooling (digestion process), it was then filtered into a 250ml standard flask and filter paper was removed with residue in it. And filtrate was diluted with 50ml distilled water, then transfer in to sample bottle for mineral analysis using Atomic Absorption Spectrophotometer

Procedure for Analysis

Digested fries samples were then taken into the instrumentation Atomic absorption spectrophotometer (AAS) Laboratory in Ogun State Institute of Technology Igbesa, Department Of Science Laboratory Technology room for further analysis to commence using the AAS. In this process, the atomic absorption spectrometer was flushed by adding diluted water through the AAS Nebulizer pipe in to the flame section.

RESULT AND DISSCUSSION

Table 1: Microbial Count (cfu/g) for Fries Sample

ISOLATE CODE	HETEROTROPHICCOUNT	COLIFORM COUNT	STAPHYLOCOCCUS COUNT	SSBC	TVBC	TVFC
API	$3.0x10^5$	$8.8x10^3$	$4.2x10^5$	$4.2x10^5$	$6.4x10^5$	$2.8x10^6$
OPI	$3.1x10^5$	$7.5x10^3$	$3.5x10^5$	$4.5x10^5$	$6.3x10^5$	$0.53x10^6$
CPI	$1.3x10^5$	$2.3x10^3$	$3.2x10^5$	$3.5x10^5$	$1.45x10^5$	$2.6x10^6$
AHI	$2.1x10^5$	$6.2x10^3$	$4.3x10^5$	$2.3x10^5$	$3.23x10^5$	$0.50x10^6$
OHI	$1.4x10^5$	$2.0x10^3$	$1.9x10^5$	$2.4x10^5$	$2.3x10^5$	$1.7x10^6$
CHI	$4.2x10^5$	$3.5x10^3$	ND	$3.2x10^5$	$3.5x10^5$	$2.7x10^6$
ACI	$4.0x10^5$	$3.3x10^3$	$3.2x10^5$	$4.0x10^5$	$1.55x10^5$	$0.50x10^6$
OCI	$3.2x10^5$	$4.2x10^3$	$5.4x10^5$	$3.3x10^5$	$1.7x10^5$	$2.8x10^6$
CCI	$2.0x10^5$	$7.6x10^3$	ND	$3.2x10^5$	$4.2x10^5$	$2.4x10^6$
AP2	$3.1x10^5$	$8.5x10^3$	$5.3x10^5$	$2.2x10^5$	$6.2x10^5$	$1.7x10^6$
OP2	$3.2x10^5$	$3.5x10^3$	$1.4x10^5$	$5.2x10^5$	$3.6x10^5$	$1.25x10^6$
CP2	$4.6x10^5$	$5.5x10^3$	$5.0x10^5$	$2.2x10^5$	$5.2x10^5$	$0.75x10^6$

AH2	$2.2x10^5$	$4.2x10^3$	$5.2x10^5$	$5.0x10^5$	$2.4x10^5$	$2.5x10^6$
OH2	$3.1x10^5$	$7.3x10^3$	$5.1x10^5$	$4.0x10^5$	$3.3x10^5$	$0.50x10^6$
CH2	$1.7x10^5$	$1.5x10^3$	$2.0x10^5$	$3.2x10^5$	$6.1x10^5$	$1.06x10^6$
AC2	$2.1x10^5$	$2.5x10^3$	$1.2x10^5$	$4.2x10^5$	$4.3x10^5$	$1.21x10^6$
OC2	$1.6x10^5$	$5.3x10^3$	$5.5x10^5$	$1.3x10^5$	$1.9x10^5$	$2.4x10^6$
CC2	$1.5x10^5$	$2.3x10^3$	ND	$5.1x10^5$	$3.1x10^5$	$2.6x10^6$
AP3	$2.2x10^5$	$2.4x10^3$	$5.5x10^5$	$3.5x10^5$	$6.2x10^5$	$1.7x10^6$
OP3	$2.1x10^5$	$5.5x10^3$	$4.2x10^5$	$2.4x10^5$	$2.3x10^5$	$2.8x10^6$
CP3	$3.5x10^5$	$4.2x10^3$	$3.5x10^5$	$5.1x10^5$	$6.0x10^5$	$1.7x10^6$
AH3	$3.4x10^5$	$4.5x10^3$	$4.0x10^5$	$1.2x10^5$	$3.3x10^5$	$0.63x10^6$
OH3	$2.0x10^5$	$2.7x10^3$	$3.1x10^5$	$2.3x10^5$	$1.55x10^5$	$0.52x10^6$
CH3	$1.6x10^5$	$6.2x10^3$	$3.2x10^5$	$3.2x10^5$	$6.3x10^5$	$2.5x10^6$
AC3	$3.0x10^5$	$2.0x10^3$	ND	$1.3x10^5$	$6.4x10^5$	$2.8x10^6$
OC3	$2.1x10^5$	$3.3x10^3$	ND	$3.5x10^5$	$5.3x10^5$	$2.4x10^6$
CC3	$2.0x10^5$	$2.0x10^3$	ND	$4.2x10^5$	$3.3x10^5$	$0.7x10^6$

NOTE: AP1 = Igbesa potato first week, OP1 = Lusadapotato first week, CP1 = Sango potato first week, AH1 = Igbesa Hot dog first week, OH1 = LusadaHot dog first week, CH1 = SangoHot dog first week, AC1 = Igbesa Chicken first week, OC1 = LusadaChicken first week, CC1 = SangoChicken first week.

AP2 = Igbesa potato second week, OP2 = Lusada potato second week, CP2 = Sango potato second week, AH2 = Igbesa Hot dog second week, OH2 = Lusada Hot dog second week, CH2 = Sango Hot dog second week, AC2 = Igbesa Chicken second week, OC2 = Lusada Chicken second week, CC2 = Sango Chicken second week

AP3 = Igbesa potato third week, OP3 = Lusada potato third week, CP3 = Sango potato third week, AH3 = Igbesa Hot dog third week, OH3 = Lusada Hot dog third week, CH3 = Sango Hot dog third week, AC3 = Igbesa Chicken third week, OC3 = Lusada Chicken third week, CC3 = Sango Chicken third week.

ND: Not Detected, TVBC: Total Viable Bacterial Count, TVFC: Total Viable Fungi Count

Table 1 above, shows the microbial load for fries samples obtained from the three (3) sites or locations. The heterotrophic counts ranged from 1.3 x 10^3 to 4.6 x 10^3 cfu/g. Coliform counts, *Salmonella shigella count, Staphylococcus* count and TVFC ranges from ranges from 1.5 x 10^3 to 8.8 x 10^3, 1.2 x 10^5 to 5.2 x 10^5, 1.8 x 10^5 to 5.5 x 10^5 and 0.5 x 10^6 to 2.8 x 10^6 respectively. The data reveals Coliform counts to be highest with count ranging from 1.5 x 10^3 to 8.8 x 10^3, followed by TVBC with count of 1.4 x 10^5 to 6.4 x 10^5.

Findings in this work on microbial counts are in consistent to previous studies carried out elsewhere (Bryan *et al*., 1992). A research carried out on street-vended rice with count as high as 7 log cfu/g on mesophilic counts. A study carried out by Ogunkoya and Sholotan (2021) in Igbesa metropolis Ogun State, Nigeria on Shawarma was in agreement with these findings, which reveals high microbial count, such might be due to the manner of display of the products. Result from this work reveals *Staphylococcus* count to be relatively low; this is in agreement with what was reported on two food services centres in a University by (Hemen *et al*., 2012); however, not in line with other studies that reveals counts on *Staphylococcus* to be high (Akusu *et al*., 2016; Ogunkoya and Sholotan 2021).

The results below revealed high heterotrophic and Coliform counts on all collected sample, this is not in line with W.H.O standards of THB 10-16 cfu/g and total coliform 0-10/g *Salmonela Shigella* count was in range of WHO standards of SSB count of 20/g (WHO, 1996). Isolation of *Salmonella spp* from samples in this research work is in not in agreement with findings reported in Wales (Meldrum *et al*., 2006) and Nigeria (Omemu *et al*., 2014). These food samples undergo high heat treatment during preparation which indicates high microbial count should not be possible since fried food have considerable shelf-life. Moreover, preparation of food in advance to consumption, exposure to flies, holding at ambient temperature are factors that might leads to increase in contamination of the food samples and eventually microbial counts on the food.

Table 2: Morphology and Biochemical Characteristics of Bacteria Isolate For Three Week

Isolate code	Gram	Shape	Motility	Urease	Methyl red	Catalase	Citrate	Indole	Identified organism
AP1	+	Cocci	__	+	+	+	ND	__	*Staphylococcus aure*

OP1	+	Cocci	__	+	+	+	ND	__	*Staphylococcus aure*
CP1	__	Rod	+	+	__	+	+	__	*Bacillius subtilis*
AH1	__	Rod	+	+	+	+	__	__	*Salmonella thyphimur*
OH1	__	Rod	+	__	+	+	__	__	*Salmonella thyphimur*
CH1	__	Rod	+	__	+	+	__	__	*Salmonella thyphimur*
AC1	__	Rod	+	__	+	+	__	+	*Escherichia coli*
OC1	__	Rod	+	__	+	+	__	+	*Escherichia coli*
CC1	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP2	+	Cocci	__	+	+	+	Nil	__	*Staphylococcus aure*
OP2	__	Rod	+	__	__	+	+	__	*Bacillius subtilis*
CP2	__	Rod	+	__	__	+	+	__	*Bacillius subtilis*
AH2	__	Rod	+	__	+	+	__	__	*Salmonella thyphimur*
OH2	__	Rod	+	__	+	+	__	__	*Salmonella thyphimur*
CH2	+	Cocci	__	+	+	+	__	__	*Staphylococcus aure*
AC2	__	Rod	+	__	+	+	__	+	*Escherichia coli*
OC2	__	Rod	+	__	+	+	__	+	*Escherichia coli*
CC2	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP3	__	Rod	+	__	__	+	+	__	*Bacillius subtilis*
OP3	__	Rod	+	__	__	+	+	__	*Bacillius subtilis*
CP3	__	Rod	+	__	__	+	+	__	*Bacillius subtilis*
AH3	__	Rod	+	__	+	+	__	__	*Salmonella thyphimur*
OH3	__	Rod	+	__	+	+	__	__	*Salmonella thyphimur*
CH3	__	Rod	+	__	+	+	__	__	*Salmonella thyphimur*
AC3	ND	ND	ND	ND	ND	ND	ND	ND	ND

OC3	ND	ND	ND	ND	ND	ND	ND	ND	ND
CC3	ND	ND	ND	ND	ND	ND	ND	ND	ND

The morphology and Biochemical characteristics of the bacteria that were isolated from the fries samples were shown in Table 2. Twenty-two organisms were found in total, of which four were gram positive and eighteen were gram negative. Bacteria isolated are; *Staphylococcus aureus*, *Bacillus subtilis*, *Salmonella thyprimurium*, and *Eschericia coli*. *Staphylococcus aureus* is a major organism that is involved in food poisoning and disease outbreak resulting from food, presence of such organism indicate lack of Good hygiene practices during food production or Good handling practices since this organism is a normal flora of the human body and often than not it get into the food through cross contamination. *Staphylococcus aureus*, has been a major culprit of food poisoning and food intoxication for decades. Ogunkoya and Sholotan (2021) have identified this organism in a work carried out on ready to eat Shawarma retailed in Ogun State. Presence of this organism correlate with the work of Okobia and Orogu (2021) which was carried out on jollof rice sold in eateries in Ozoro, Delta State, Nigeria.

Contaminations of food products are common during food production. Cross contamination from raw materials to cooked products or utensils and improper handling of foods have been studied to be major reasons while *Salmonella* have been isolated from food samples. Results from this investigation reveal presence of *Salmonella spp*., which is not in line with work carried out previously by several researcher (Sobieh, 2014; Tavakoli and Riazipour, 2008; Abd El-Shaheed, 2005). In a work carried out by Moussa *et al*. (2010) failed to detect *Salmonella spp* in grilled Kofta and grilled chicken. Saad *et al*., 2018 failed to detect *Salmonella* when working on Ready to eat Meat, grilled Kofta, grilled chicken, beef luncheon and chicken luncheon in a work carried out in Benha University, Egypt. Fecal oral contamination is prevalence among food producers with lack of knowledge of food production and possibly with lack of education on how well to handle food throughout the food production chain. *Escherichia coli* have been the major organism resulting from fecal oral contamination of food products. Presence of this organism is an indication of poor hygienic practices by the handlers or contamination from the environment and flies. Okobia and Oroju (2021) have reported presence of *E. coli* from jollof rice sold in eateries in Delta State Nigeria. Similarly, findings from this work correlate with that of (Oranusi *et al*., 2013).

The identified bacteria isolated in this work are similar to the microorganism reported by (Ogunkoya *et al*., 2022) on Bacteriological quality assessment of raw and ready to eat Shrimps retailed in Ogun State, Nigeria. Of all the fries samples examined in this study, 37% contain *Salmonella spp*., which is the highest occurring Microorganism followed by *Bacillus* with 27% while *Staphylococcus* and *Escherichia* coli have 18% respectively. Occurrence of *Salmonella* in these samples might be as a result of post-contamination. A study carried out in Maputo on street vended food is not in agreement with this work; isolation of *Salmonella* is not common as reported by (Acácio *et al*., 2020). Nevertheless, Oranusi and Braide (2012) have reported a high occurrence of *S. aureus* in traditional food in Nigeria.

Foods must be as free of contamination as is reasonably possible. Given that *E. coli, S. aureus,* and *Bacillus sp.* are pathogenic and have been linked to food-borne illnesses, their presence indicates a possible health risk (Granum, 2005; Wagner, 2009; CFIA, 2009).

Good hygiene procedures, such as the adoption of Hazard Analysis Critical Control Point (HACCP) in the chain of food production and processing, can help avoid foodborne illness. To prevent foodborne illness, the appropriate authorities should educate food handlers and food vendors on best procedures and strictly monitor the ready-to-eat meals offered in schools.prevent foodborne illness, the appropriate authorities should educate food handlers and food sellers about best practices and strictly monitor the ready-to-eat meals offered in schools.

Table 3: Characteristics of fungi isolated

Isolates	Macroscopy	Microscopy	Identified organism
AH1 (E)	Creamy white colonies	*Budding yeast cells*	*Saccharomyces cerevisiae*
OP1 (F)	Creamy white colonies	*Budding yeast cells*	*Saccharomyces cerevisiae*
AP2 (S)	White cotton Like colonies	*Hyphae without rhizoids*	*Mucor spp*
OP2 (T)	White cream Cotton flat spreading	*Septate hyphae round conidiophore*	*Fusarium spp*
CP2 (U)	Creamy white colonies	*Budding yeast cells*	*Saccharomyces cerevisiae*

AP3 (10)	Creamy white colonies	*Budding yeast cells*	*Saccharomyces cerevisiae*

Six fungi isolates were found in the sample, and Table 4 lists their distinctive characteristics. The colonies' colors ranged from creamy to white, and they were all identified as *Saccharomyces cerevisiae*, *Mucor spp*, and *Fasarium spp*. Isolation of Mucor spp., corroborate with the findings of Taulo *et al*., 2008; Oranusi *et al*., 2013 in which this organisms was implicated in ready-to-eat foods. The spore-forming nature of the molds *Fusarium spp.* and *Mucor spp*. may be the cause of their presence in foods. The vegetative cells may have been destroyed during processing, but these heat-resistant spores may have survived. Food contamination may have been caused by improper preparation, insufficient heating, or secondary contamination through contact with contaminated tools and utensils.

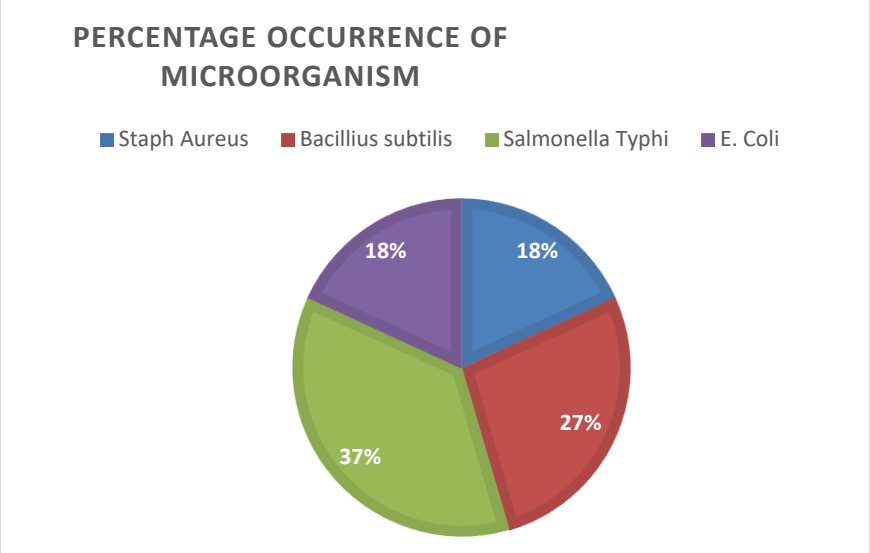

Figure 1: Pie chart showing the percentage occurrence of bacteria in all samples

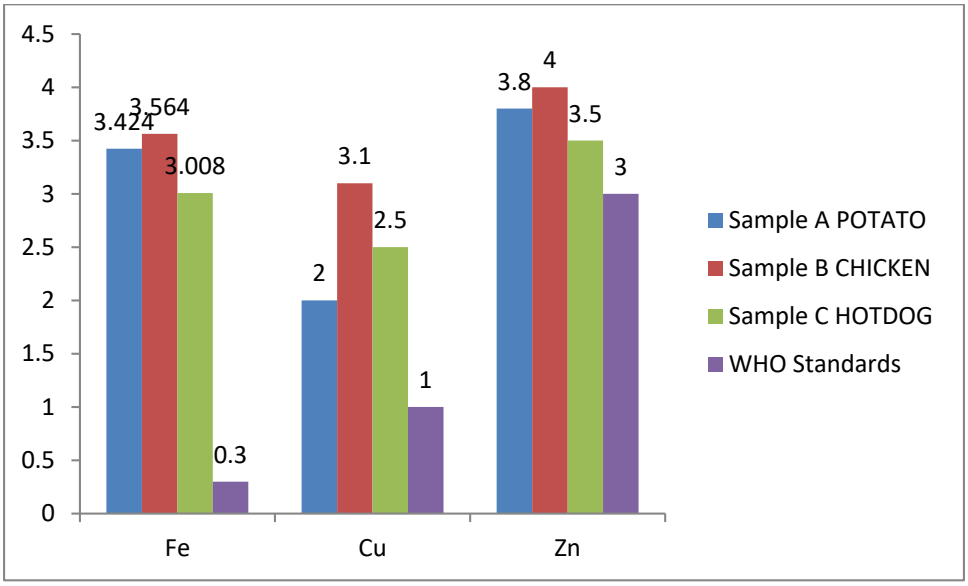

Figure 2: Bar chat illustrating the heavy metal found in the three samples of the fries from site A

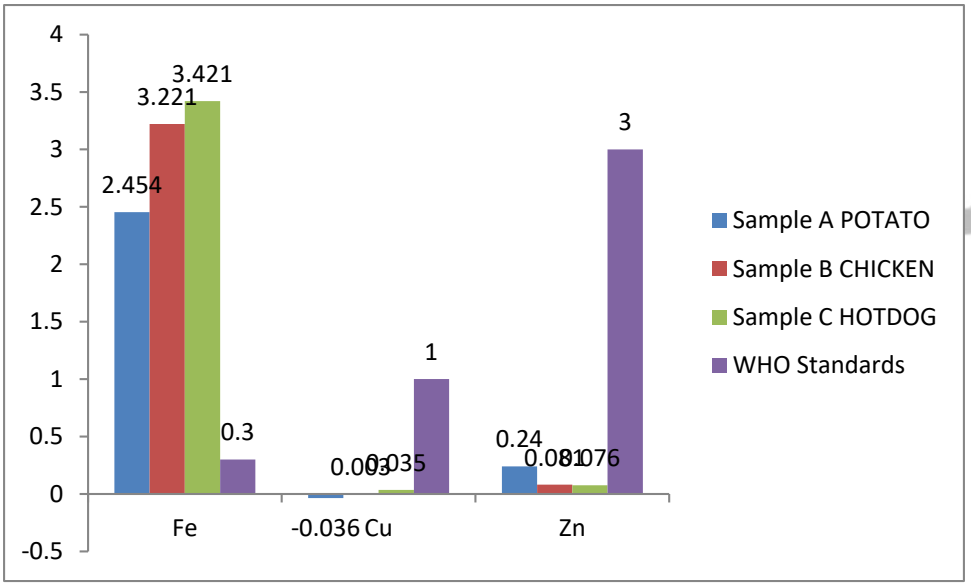

Figure 3: Bar chat illustrating the heavy metal found in the three samples of the fries from site B

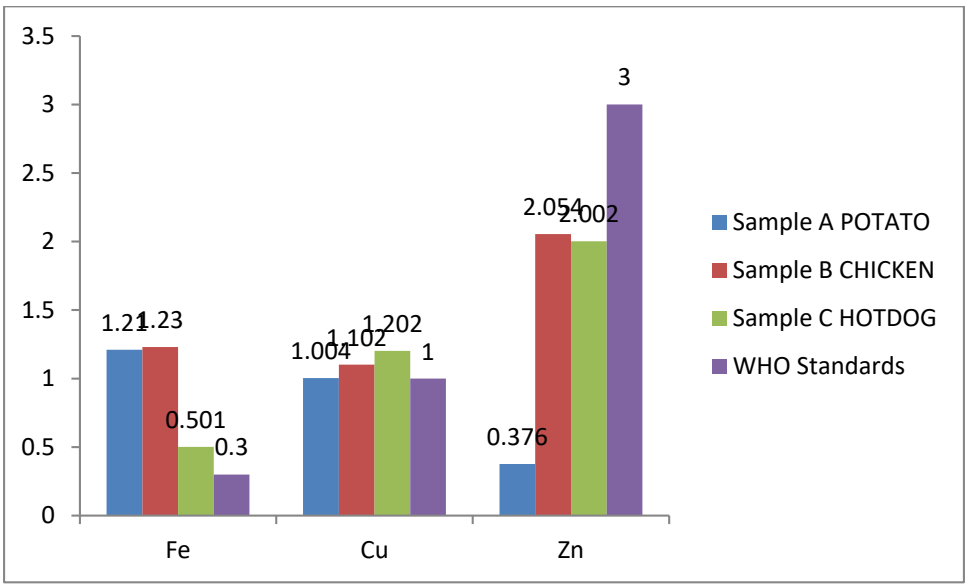

Figure 4: Bar chat illustrating the heavy metal found in the three samples of the fries from site C

The three samples of fries tested positive for heavy metal, as shown in figures above. Fe has a range of 2.454 to 3.421 mg, Cu has a range of -0.036 to 0.0035 mg, and Zn has a range of 0.240 to 0.081 mg. Fe and Cu concentrations were highest in sample C, while Zn concentrations were highest in sample B (0.08 mg). Cu and Zn fall short of WHO guidelines, however Fe exceeds the level set forth by the organization. If the sampled fries show signs of Fe pollution, there will be health repercussions. The results of this study are similar to those of Ako and Salih (2015) study, which found decreased lead amounts in smoked and oven-dried fish samples in Minna metropolis, Niger State of Nigeria. The findings of Oyelola *et al*. (2013) on the heavy metal and microbiological contents of roadside roasted maize and plantain in Alimosho Local Government Area of Lagos State, Nigeria, are not in agreement to the results of this investigation also Innocent *et al*. (2017) who investigated the approximate composition, microbiological safety, and heavy metal contaminations of garri sold in Benue, North-Central Nigeria revealed high level of metals in the samples analyzed. Bello *et al*. (2022) reported high level of Pb, Cr and Cd when a research was done on Road-side roasted plantain and maize in Zaria and environs. This was similar to results obtained from Igbesa sample as the metal analyzed are of high proportion as compared to other site. Presence of these metals in the food samples might be as a result of the way this food samples are displayed. Often times these samples are not covered and are displayed close to the road side. Presence of numerous industries that and their uncontrolled waste discharged in the atmosphere can contribute to the presence of these metals in the samples analyzed.

CONCLUSION

Numerous observational studies have demonstrated that street meals are sometimes kept at unsanitary temperatures, handled excessively by food vendors, and served in filthy environments, making them susceptible to infection. Food poisoning may result from the presence of germs in the sold fries due to the unsanitary practices of our local markets, particularly the handling of the fries.

Eating infected, inadequately cooked, or processed fries poses a risk, particularly for the samples examined, which are marketed in Ogun State and elsewhere.

Recommendation

Based on the findings of this study, the following recommendations are made;

i. Conscious efforts should be made toward the reduction of heavy metal contamination of environments such as air pollution from company activities in the Igbesa Area.
ii. Adequate waste disposal system should be put in place to avoid incessant waste disposal in the environment.
iii. Food-safety practices, education, and regulations related to food production have been recognized as the measures to ensure the improvement of the quality of street foods.

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