



## MICROBIAL QUALITY OF SELECTED LOCALY VENDED STREET SNACKS COMMONLY CONSUMED IN OGUN STATE

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### Abstract

Microorganisms are the primary cause of food poisoning. This study determines the microbial load of selected local snacks commonly consumed in Ogun State. The specimen for the analysis were bought from the Abeokuta, Ijebu, Remo and Yewa areas of Ogun State, in the busy parking lot, close to regular markets having high proportion of regionally vended snacks patronized by the populace and adventurers. Microbial analysis was carried out on the street vended snacks. Result reveals that locally sold snacks Aadun (maize cake), Robo (melon cake), and Ipekere (plantain chips) from the Yewa area have the lower fungi count ( $1.0 \times 10^6$ cfu/g); Robo, with lowest bacteria and fungi count  $2.0 \times 10^6$ cfu/g and  $1.0 \times 10^6$ cfu/g and Ipekere with lowest bacteria count ( $1.0 \times 10^6$ cfu/g), with no growth and lowest Staphylococcus count. While fungi lowest count for Ipekere ( $10 \times 10^6$ cfu/g) was in the Ijebu area. Five dissimilar bacterial and three fungal spots were identified. The existence of *E. coli* and Enterococci which are pointer organisms calls for care. The study concludes that locally vended snacks (Adun, Robo, and Ipekere) from the Yewa area have the lowest fungi and bacteria with no growth of Staphylococcus count hence, are better for consumption.

**Keywords:** Local snacks, Microbial loads, Street foods. Ogun state

### INTRODUCTION

Consumption of poorly prepared snacks can lead to food borne diseases which is a potential risk to health. (Barro *et al.*, 2005). Snacks are inexpensive and widely consumed as they are often major sources of daily food intakes of children and adult (World Health Organization, 2011). Notwithstanding the dissimilarities in eating habit in every part of the country, one thing is consonant; snacking is on the rise, the cause for the fluctuation away from the conventional style of eating three meals a day can be ascribed to a wide diversity of circumstances which include the failure of formal family meals and the rise in accessibility of foods that can easily be eaten while on the go (Martins and Anelich, 2000). In a general sense, snacks are splited into global and regional. Global finger foods include sandwiches, kebabs, hotdogs, meat pies, salad, doughnut and other bakery products, while regional finger foods consumed by Ogun State people include fried plantain chips (ipekere), roasted corn meal cake (Aadun), melon cake (robo), ojojo (friedwater yam balls), ajogun (fried cassava balls), boiled corn (owowo), roasted plantain (booli), potato and yam chips (dundun) and fried maize paste (kokoro).

The protection and life span of the finger foods hinge on the interconnection of chemicals, physical and microbial factors Falola *et al.*, (2011). Finger foods exhibited on open places can easily be polluted by dust, exhaust smoke, insects, hands of intending buyers and other pollutants. Recently, food borne illness emerging from finger foods are major health problem (Frenzen *et al.*, 2005). The conventional processing ways used in preparations, unsuitable climate and poor sanitation by food handlers are some of the origin of adulterant of finger foods. Customer who rely on such food are more fascinated in accessibility and low cost with no awareness of its safety, superiority and sterility (Muinde and kuria 2005; Barro *et al.*, 2005). Already finger foods are convenient and do not usually involve further cooking. (Martins and Anelich, 2000) It can be a suitable medium for conveyance of food poison and sources of microbial contamination. (Simpoulous and Bhat, 2002).

Street foods are regularly linked with diarrhea infection which crop up as a result of inappropriate use of added ingredients, the existence of pathogenic bacteria, adulteration and ignoring of suitable manufacturing practices (GMPS) and suitable hygienic practices (GHPs) (Falola *et al.*, 2011).

Salesperson are often unschooled, unauthorized, unskilled in food wholesomeness, and they work under unhygienic surroundings with no awareness about the origin of food borne infections (Barro *et al.*, 2005). Most of the snacks are not well safeguarded from flies, which may convey food borne microbes. Safe food repository condition is seldom applied to finger foods. Prospective wellness threats are linked with pollutant of food by *Escherichia coli*, *Salmonella typhi*, *Pseudomonas* species, and *Staphylococcus aureus* during preparations and post-preparation stages (Barro *et al.*, 2005). Consequently, the objective of the present investigation is to provide information on microbiological feature of regionally vended snacks sold in Abeokuta, Ijebu, Remo, and Yewa areas of Ogun State, Nigeria.

## MATERIALS AND METHODS

### SOURCES OF SAMPLE

The aforementioned specimens for the present investigation were bought from four localities in Ogun State, in the busy parking lot, close to regular markets having high proportion of regionally vended snacks patronized by the populace and adventurers. These localities are Ita oshin Garage in Abeokuta, Lagos Garage in Ijebu Ode, Sagamu Garrage in Remo and Ilaro Garrage in Yewa areas respectively..

### MICROBIAL LOAD ANALYSIS

Ten fold serial dilutions of specimens were done. Spread plate and streaking culturing techniques Cappucino and Sherman (2010) were used to itemize and spot bacteria and fungi in the specimens. One (1) gram of each food specimen was aseptically combined and coalescenced in 10 ml of sterile distilled water (10<sup>-1</sup> dilution). Serial dilutions of the commixed were made to 10<sup>-2</sup> and 10<sup>-3</sup> and each dilution was plated in replicate using Plate count agar for total heterotrophic bacteria count and isolation of bacterial isolates, MacConkey medium for coliform count and isolation of isolates, Sabaraud Dextrose agar (SDA) plus chloramphenicol for fungal count and isolation of isolates and Mannitol salt agar for Staphylococci isolation. Pure cultures of bacterial isolates were identified using cultural, morphological and biochemical depiction. Identification of the bacteria to general level was based on the schemes of (Boone *et al.*, 2005).

The purified fungal isolates were analyzed on the basis of macroscopic and microscopic attributes by slide culture approach, and lacto phenol staining. The schemes of (Barnet and Hunter, 2000 and Watanabe, (2010) were used for the documentation. The plates were incubated at 35 ± 2°C for 72 hours ± 2 hours and 24 hours ± 2 hours (total bacterial count and coliform count respectively) and 25 ± 2°C for V.

## RESULT

Table 1: MICROBIAL ANALYSIS OF SNACKS IN SELECTED REGION OF OGUN STATE

| Region   | Vended snacks | x 10 <sup>6</sup> cfu/g |                       |                        |
|----------|---------------|-------------------------|-----------------------|------------------------|
|          |               | TPC                     | <i>Staphylococcus</i> | Fungi                  |
| Abeokuta | Aadun         | 124±2.00 <sup>a</sup>   | 12±2.05 <sup>a</sup>  | 41±1.73 <sup>a</sup>   |
|          | Robo          | 16±2.00 <sup>b</sup>    | Nil                   | 16±1.00 <sup>b</sup>   |
|          | Ipekere       | 5.0±1.73 <sup>b</sup>   | 7.0±1.00 <sup>a</sup> | 3.0±0.00 <sup>b</sup>  |
| Yewa     | Aadun         | 6.0±0.00 <sup>a</sup>   | 4.0±1.73 <sup>a</sup> | 1.0±1.73 <sup>a</sup>  |
|          | Robo          | 2.0±2.00 <sup>b</sup>   | Nil                   | 1.0±1.73 <sup>a</sup>  |
|          | Ipekere       | Nil                     | Nil                   | 1.0±0.00 <sup>a</sup>  |
| Ijebu    | Aadun         | 92.0±3.46 <sup>a</sup>  | 3.0±0.00 <sup>a</sup> | 7.0±4.00 <sup>a</sup>  |
|          | Robo          | 9.0±2.65 <sup>b</sup>   | Nil                   | 2.0±1.00 <sup>a</sup>  |
|          | Ipekere       | 2.0±0.00 <sup>b</sup>   | 1.0±0.00 <sup>a</sup> | 1.0±0.00 <sup>a</sup>  |
| Remo     | Aadun         | 5.0±1.00 <sup>a</sup>   | 7.0±3.00 <sup>a</sup> | 10.0±3.00 <sup>a</sup> |
|          | Robo          | 2.0±1.00 <sup>a</sup>   | Nil                   | 4.0±1.00 <sup>a</sup>  |
|          | Ipekere       | 6.0±1.73 <sup>a</sup>   | 5.0±1.00 <sup>b</sup> | 4.0±2.00 <sup>a</sup>  |

Table 2: Suspected bacteria isolate

| S/N | Bacteria                  | Microscopic Identification     |
|-----|---------------------------|--------------------------------|
| 1   | <i>Escherichia spp</i>    | Gram negative, rod             |
| 2   | <i>Staphylococcus spp</i> | Gram negative, Cocci           |
| 3.  | <i>Enterococcus spp</i>   | Gram negative, Cocci, Cluster  |
| 4.  | <i>Klebsiella spp</i>     | Gram negative, Rod, Non motile |
| 5.  | <i>Bacillus spp</i>       | Gram positive, Rod, motile     |

Table 3: Suspected fungi isolate

| S/N | Fungi                  | Macroscopic Identification | Microscopic Identification             |
|-----|------------------------|----------------------------|----------------------------------------|
| 1   | <i>Aspergillus spp</i> | Black colonies             | Septate hyphae with V- shape branching |
| 2.  | <i>Mucor spp</i>       | Black spongy               | Cell are spongy-like growth            |
| 3.  | <i>Penicillin spp</i>  | Pink creamy                | Cover with hairy growth                |

## DISCUSSION OF RESULT

The microbial load of vended snacks *Aadun* (Maize cake) in selected Motor Park in Ogun state ranges from 5.0 to  $125 \times 10^6$  cfu/g with Abeokuta area possessing the highest value and Remo area possessing the lowest. *Robo* (Melon cake) value ranges from 2.0 to  $16.0 \times 10^6$  cfu/g with Abeokuta area possessing the highest value and Remo and Yewa area possessing the lowest value. *Ipekere* (Plantain chips) value ranges from 2.0 to  $6.0 \times 10^6$  cfu/g with Remo possessing the highest and Ijebu area possessing the lowest value. No value was recorded for Yewa area. The result of staphylococcus count for *Aadun* ranges from 3.0 to  $12 \times 10^6$  cfu/g with *Aadun* from Abeokuta area having the highest value and Ijebu area having the lowest. The result of staphylococcus count for *Robo* reveals that there were no counts in all the areas. *Staphylococcus* count for *Ipekere* ranges from 1.0 to  $7.0 \times 10^6$  cfu/g with Abeokuta area having the highest value and Ijebu area having the lowest while Yewa area have no count.

The organisms isolated from this research work are *E.coli*, *Enterococcus spp*, *Staphylococcus aureus*, *Bacillus subtilis*, *Klebsiella spp*, *Pseudomonas aeruginosa*, *Aspergillus flavus*, *Mucor spp* and *Penicillium spp*. The indication *E. coli*, *Enterococcus*, *Klebsiella spp*, *Staphylococcus aureus*, is of care and further support the possibility of fecal contamination of products due to poor hygienic condition (Oranusi *et al.*, 2007). The *Bacillus* and *Pseudomonas spp* were isolated; however, *Salmonella* and *Shigella spp* were not detected. These microbes are known to be environmental pollutants and opportunistic pathogens (Eni *et al.*, 2010) have been implied in food poisoning, and are known to cause food decomposition that can cause illness. The principal bacterial pollutant was *S. aureus* this could be traced to the fact that it is plentiful in human body (Balaban *et al.*, 2000 and Oranusi *et al.*, 2006). Comparably, *Bacillus cereus* showed high proportion. The presence of *Bacillus cereus* can be traced to its abundance in soil, air and water in the study area hence, it can easily be present in these snacks. This finding is in agreement with reports of (Oluwafemi, *et al* 2005; Yah *et al.*, 2009 and Okonko *et al.*, 2009) they spotted similar microbes from sausages, meat pie and sea foods respectively.

Fungi count for *Aadun* ranges from 1.0 to  $\times 10^6$  cfu/g with Abeokuta area possessing the highest count and Yewa area possessing the lowest counts. Fungi count for *Robo* ranges from 1.0 to  $6.0 \times 10^6$  cfu/g with Abeokuta area possessing the highest value and Yewa area possessing the lowest. Fungi count for *Ipekere* ranges from 1.0 to  $4.0 \times 10^6$  cfu/g with Remo area possessing the highest value and Yewa and Ijebu area possessing the lowest. The existence of *Aspergillus*, *Penicillium* and *Mucor* could be traced to the surrounding air and packaging materials (Aboloma 2008, Kawo *et al.*, 2009). *Aspergillus spp* are usual fungal agent of food borne illness, (Peraica, *et al.*, 2001, Katherine *et al.*, 2006). A correlation of the level of contamination of snacks *Aadun* from collection points representing Abeokuta, Yewa, Ijebu and Remo showed no significant different in areas. Snacks are consumed by all age groups



with high acceptance amongst school children, travelers and youths, it is therefore binding that these snacks be free from contaminant as much as possible. Food borne infection can be nipped in the bud by good hygiene practice during the preparation of snacks.

## CONCLUSION

This study concludes that locally vended snacks *AadunRobo*, and *Ipekere* from Yewa area has the lowest fungi and bacteria with no growth of *Staphylococcus*.

## RECOMMENDATION

This study recommends that suitable manufacturing and hygienic practices, appropriate and frequent hand washing, decontamination of all equipment and utensils, care for the environment and the packaging materials should be employed in the production of the street vended snacks. Secondly, Vendors should be educated and trained in hygienic food handling practices and safe food storage. Lastly, the populace and passengers should only eat street vended snacks *Aadun*, *Robo*, and *Ipekere* from the Yewa area as it has the lowest fungi, bacteria and *staphylococcus* count with no growth, thereby making the snacks of the area safe for consumption.

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