Research Article

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Extent of pathogenic bacterial contamination of egg rolls sold by hawkers in Delta state, Nigeria

Abstract

The bacterial contamination of egg rolls sold by hawkers in Delta state was investigated. A total of 60 samples of egg rolls were randomly bought from hawkers from four major locations in Delta state and screened for pathogenic bacterial contamination. The samples were microbiologically analyzed using spread plate method of 1ml of dilution factor of 10-7 aliquot inoculums of the samples. The total aerobic count showed heavy contamination ranged from 2.50x106–4.80x108cfu/g, *Staphylococcus aureus* count ranged from 1.47x106-2.80x108 cfu/g and *Enterobacteriaceae* count ranged from 2.17x106-9.6x108 cfu/g. Probable organisms isolated from the egg rolls sold by hawkers were *Staphylococcus aureus, Pseudomonas, Klebsiella, Bacillus, Salmonella, Streptococcus, Proteus, Escherichia coli, Shigella* and *Micrococcus*. Most of the egg rolls sampled were therefore considered to pose health risk to the consumers, making it imperative to institute sanitary measures during processing, storage and marketing of the egg rolls to prevent food borne illness.

Keywords: bacterial contamination, egg rolls, food borne illness, hawkers, Nigeria

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Introduction

Foods borne illness are diseases toxic in nature caused by agents that enter the body through the ingestion of food.[1] Bacterial agents that cause food borne illness include *Staphyloccus aureus, Escherichia coli Salmonella, Bacillus cerus* etc.[2] Staphylococcal intoxication is a leading cause of food borne intoxication and entero toxigenic Staphylococcal strain have been isolated from foods implicated illnesses.[3]

Egg roll is a Ready-To-Eat Food (Snack). It is a high energy food because it contains carbohydrate, protein, fat and oil. It is usually eaten by all ages and mostly children and youths. It is potentially hazardous because it supports rapid growth of pathogens which result in food borne illness. In addition, the nature of preparation and sale of this food extensively involve contamination and cross contamination from soil, water, air, equipments and the human handlers. A number of food in Nigeria have been reported to have high incidence of bacteria,[4] however, there is little information about the extent of pathogenic bacterial contamination of egg rolls sold by hawkers.

The objective of this research is to investigate the extent of pathogenic bacterial contamination of egg rolls sold by hawkers in Delta state, Nigeria.

Materials and method

Sample collection

Egg rolls were randomly collected from hawkers from four major locations namely: ASaba, Agbor, Ibusa and Sapele in Delta state, Nigeria. Fifteen samples were collected from each location with a sterile polythene bags in the morning, afternoon and evening and transferred immediately to the laboratory for bacterial analysis.

Sample preparation

One gram of each egg roll sample was weighed into a sterile mortar and grounded with sterile pestel. 9ml of sterile distilled water was poured into the mortar for the mixing of the samples. This was transferred into a test tube followed by serial dilution up to 10^{-7} dilution.

Total and differential count (bacteriology)

1ml of 10^{-7} dilution was plated on nutrient agar plates and incubated at 37°C for 24 h using spread plate method to determine the viable count. The procedure was repeated for Staphylococcus count and *Enterobacteriaceae* count respectively. Total number of colonies was done using digital colony counter (LABFI.TTM Ambal, India).

Identification of isolates

The isolates obtained in the plate counts were identified based on established conventional cultural, morphological and biochemical characterizations.[5]

Statistical analysis

All data were analysed using the general linear model procedures of SAS and Analysis of Variance (ANOVA).

Results

The mean viable count, Staphylococcus count and *Enterobacteriaceae* count were shown in the Table 1 below.

The total viable count of the four locations ranged from $2.5x10^6$–$4.0x10^8$. The total viable count in Asaba is above the approved Public Health Laboratory Service (PHLS 1996). The *Enterobacteriaceae*

counts for all samples obtained from the four location were above the limit specified by British Standard Institute[6] except the sample from Ibusa. The Staphylococcus count of Ibusa and Agbor were within the range of 10^5 and 10^6 which is normal with (PHLS 1996) except the sample from Asaba and Sapele which are above the specified limit.

The probable organisms isolated from the egg rolls were *Staphylococcus aureus, Micrococus, Bacillus, Esherichia coli, Streptococcus, Salmonella, Shigella, Pseudomonas, Proteus* and *Klebsiella.* All these bacteria have been implicated in food borne illness.[7,8]

Table 1 The mean viable count, Staphylococcus count and *Enterobacteriaceae* count

Count	Asaba	Ibusa	Sapele	Agbor
Aerobic count	4.0×10^8	3.5×10^6	3.72×10^7	2.5×10^6
S. aureus	2.8×10^8	3.3×10^5	2.2×10^7	1.47×10^6
Coliform	9.6×10^8	5.0×10^4	5.2×10^7	2.17×10^6

Discussion

The diseases associated with food borne pathogens are not properly recorded in Nigeria. Food borne Salmonellosis has been associated with consumption of various food especially meat and poultry products.[4] The high *Enterobacteriaceae* count is an indication of potential bacterial contamination during processing, distribution and storage. Their presence in large numbers in egg rolls indicate recontamination due to cross contamination of raw materials, dirty equipments or poor hygienic handling.[9] *Escherichia coli* have the potential to cause diarrhea.[10] According,[11] the presence of *Staphylococcus aureus* could be as a result of it being common organism on the skin and hands hence their presence in egg rolls should be as a result of contamination of the handlers. *Esherichia coli* have been reported in fermented milk by.[12] Bacillus presence can be traced to the fact that it is abundant spores in the air and water hence can easily contaminate the egg rolls. This report is in agreement to the report of.[13–17]

Egg roll is eaten by all ages of the populace and mostly children and youths, it is mandatory that it will be free from bacterial contamination to prevent food borne illness.

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None.

Conflict of interest

There is no conflict to publish the article in this Journal.

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