Bacteriological Assessment and Antibiotic Susceptibility of Slice Roasted Beef (Suya) Retailed in Port Harcourt Metropolis

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***Abstracts*: - An already prepared suya meat (sliced roasted beef) samples were purchased from suya processors in four different locations within Port Harcourt metropolis and was taken to the laboratory for immediate analysis. A total of 16 suya samples were purchased. (4 sample from each location). The bacterial counts from the samples ranges from 3.5 x10^5 –9.1 × 10^5 cfu/g . The moisture contents was determine and they ranges from 44.50 -4.90.%. Bacteriological quality of suya was carried out and antibiotic susceptibility was conducted to determine whether they were resistance or susceptible to four major antibiotics. The concentration of the antibiotics use for the study are gentamycin (10ug) Ceptriaxone(30ug) Tetracycline (30ug) Azithromycin (15ug). Ceftriaxone recorded high percentage of susceptibility among other antibiotics. The following species recorded maximum percentage occurrence; Staphylococcus, and *E.coli* species.**

***Keywords:* Food, microorganism, Antibiotics, Port Harcourt metropolis.**

I. INTRODUCTION

It is a culure in Nigeria were people enjoy eating sliced roasted beef (suya). It could be eaten alone or with soft drinks or alcohol .processed meat products are often contaminated with pathogens before or during preparation (wiri, 2017). Suya is traditionally a delicacy of the Husa/Fulani tribe of the northern Nigeria. The Hausa/Fulani people are naturally nomadic and often processes their catles to suya. The fact that same antibiotics use for the treatment of human diseases are also use in the treatment of cattles raises the probability of antibiotic résistance .There are other process ready to eat meat gotten from cattle apart from suya and they includes, balangu kund and kilishi . suya is the most popular among process meat eaten in Nigeria,(FAO, 1999)Suya is produced from boneless meat, some are hung on stick and spiced with peanut cake, salt, pepper, vegetable oil and other spices and then roasted on a glowing charcoal fire . Meat from freshly slaughtered and healthy cattle should be free from microbial contamination, or if present at avery low microbial populations, It was based on the above points that bacteriological assessment and antibiotic susceptibility of slice roasted beef (suya) retailed in port harcourt metropolis was conducted.

II. METHODOLOGY

Sampling

Samples of suya used in the study were purchased from four suya spots in Port Harcourt metropolis in Rivers state. A total of 16 samples were collected for the study. Four replicate samples were purchased from each location. The ready to eat samples were transported to the laboratory in sterile bags packed in insulated containers with ice packs. Analyses were carried out within few hours after sampling. Where immediate bacteriological examination was to be delayed, the samples were refrigerated at 4°C and analyzed within 24hour of collection (Inyang et al 2005)

Bacteriological analyses

The total viable counts were carried out using Nutrient agar (Oxoid Ltd) England. Ten fold Serial dilution preparation, 10.0g of sample was aseptically transferred into 90.0ml of diluted water and homogenized by vortex. Subsequent serial dilutions up to10^{-5} were made (Kalalou et. Al., 2004). The enumeration of micro organisms in the samples was by the pour plate technique. At the end of the incubation, resultant bacterial colonies were counted.

Discrete bacterial colonies on Nutrient agar (NA) were sub-cultured onto freshly prepared nutrient agar plate by streaking. Stock culture of the isolates were developed on slants and stored at 10°C with transfers at intervals of 14days (Ojokoh, 2006). Isolates were Gram stained identified by cultural and morphological characteristics as well as biochemical tests such as the catalase, coagulase amongst others in accordance with the methods of (Cheesbrough 2000).

Determination of moisture content of suya

The moisture content of the suya samples were determined by the methods of AOAC (2004) on dry weight basis.

Statistical analyses

The data generated were subjected to simple statistical analysis such as spss .

III. RESULTS

The moisture contents of suya samples evaluated in this study ranged from 44.50 - 4.90 % as presented in table 1-4while

bacterial count ranged from 3.5 x10^5 –9.1 × $10^5$and are presented from table 1-4. A wide array of bacteria were isolated, they includes *Ecoli*, *staphylococcus* species, *salmonella* , *bacillus* and *Klebsiella* species, *E.coli* and staphylococcus recorded recorded 100% occurrence in all samples, see table 4-8. The organisms isolated reacted differently to four broad spectrum antibiotics. Ceptriaxone recorded 100% susceptibility.

Table 1: Microbial counts (10^5 cfu / g) and moisture contents of suya samples from Agip

Location	Sample code	Moisture content	Bacterial count
AGIP	AGP 01	45.5	7.5X10^5
AGIP	AGP 02	46.5	5.3X10^5
AGIP	AGP 03	44.3	3.5X10^5
AGIP	AGP 04	49.5	3.6X10^5

Table 2: Microbial counts (10^5 cfu / g) and moisture contents of suya samples from GRA

Location	Sample code	Moisture content (%)	Bacterial count
GRA	GRA 01	48.1	6.5X10^5
GRA	GRA 02	49.3	7.8X10^5
GRA	GRA 03	48.9	7.4X10^5
GRA	GRA 04	48.8	6.6X10^5

Table 3: Microbial counts (10^5 cfu / g) and moisture contents of suya samples from Rumuola

Location	Sample code	Moisture content (%)	Bacterial count 7.7x10^5
Rumuola	Ola 01	43.5	7.5x10^5
Rumuola	Ola 02	44.6	7.6x10^5
Rumuola	Ola 03	45.7	8.1x10^5
Rumuola	Ola 04	45.7	7.8x10^5

Table 4: Microbial counts (10^5 cfu / g) and moisture contents of suya samples from Town Area

Location	Sample code	Moisture content (%)	Bacterial count
Town	Town 01	44.8	5.5x10^5
Town	Town 02	45.7	4.5x10^5
Town	Town 03	46.5	6.5x10^5
Town	Town 04	45.5	6.5x10^5

Table 5: Bacterial isolates and antibiotic susceptibility of samples from AGIP

Sample code	Isolates	Antibiotics Susceptibility			
		CEP	CN	TET	AMOX
AGP01	*E. coli* species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	*Pseudomonas*species	+	-	+	+
	Bacilus species	+	+	-	+
AGP02	E. coli species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	Klebsiella species	+	-	+	+
A GP03	*E. coli* species	+	-	+	-
	Staphylococcus species	+	-	-	-
	Salmonella species	+	+	+	+
AGP04	*E. coli* species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	Pseudomonas species	+	-	+	-

Table 6: Bacterial isolates and antibiotic susceptibility of samples from GRA

Sample code	Isolates	Antibiotics Susceptibility			
		CEP	CN	TET	AMOX
GRA01	*E.coli* species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	Bacilus species	+	+	-	+
GRA02	*E.coli* species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	Klebsiella species	+	-	+	+
GRA03	*E.coli* species	+	-	+	-
	Staphylococcus species	+	-	-	-
	Salmonella species	+	+	+	+
GRA04	*E. coli* species	+	-	+	-
	Staphylococcus specie	+	-	+	+

Table 7:Bacterial isolates and antibiotic susceptibility of samples from RUMUOLA

Sample code	Isolates	Antibiotics Susceptibility			
		CEP	CN	TET	AMOX
OLA01	E.coli species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	Pseudomonas species	+	-	+	+
	Bacilus species	+	+	-	+
OLA02	*E.coli* species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	Klebsiella species	+	-	+	+
OLA03	*E.coli* species	+	-	+	-
	Staphylococcus species	+	-	-	-
	Salmonella species	+	+	+	+
OLA04	*E. coli* species	+	-	-	+
	Staphylococcus specie	+	+	+	+

Table 8: Bacterial isolates and antibiotic susceptibility of samples from TOWN AREA

Sample code	Isolates	Antibiotics Susceptibility			
		CEP	CN	TET	AMOX
TWN01	*E.coli* species	+	-	+	-
	Staphylococcus specie	+	-	-	-
	Pseudomonas species	+	-	+	+
TWN02	*E. coli* species *Staphylococcus* specie	+	-	+	-
		+	-	-	-
TWN03	*E.coli* species *Staphylococcus* species	+	-	+	-
	Salmonella species	+	-	-	-
		+	+	+	+
TWN04	*E. coli* species	+	+	-	+
	Staphylococcus specie	+	+	-	-

IV. DISCUSSION

The moisture contents of suya samples varied from one location to other. The reason for variability in moisture contents among the locations is believed to be the method of preparation at different interval. Agip has a moisture content ranged of 43.5 – 49.5%, GRA ranged from 48.1 – 49.3%, Rumuola ranged from 43.5 – 45.7% and lastly Town Area ranged from 44.8 – 46.5%. The bacterial counts ranges are ; Agip 3.5×10^5-7.5 x10^5,GRA 6.5X10^5 -9.1x1o^5, Rumuola 7.5 x 105-8.1 x 105, Town area 4.5 x 105 – 6.5 x105(cfu/g) and 0.31 to 0.85 × 10^5 (cfu/g) . The report in this study is within the range of those of Adeina et. al., (2006) The bacterial count is within acceptable range under the public health laboratory service guidline. The presence of *E. coli* in suya is a public health alert for danger consuming the product. Staphylococcus species is an indication for possible staphylococcal food poisoning, Salmonella spp and Klebsiella spp , coliforms and Bacillus spp present in sliced roasted beef rendered the samples unsatisfactory according to public health laboratory standard (PHLS 2000). The level of presence of these organisms in food has been described as index of food hygiene .FAO (1999) The presence of Staphylococcus spp in most of the samples could be contamination from the nose since the suya handlers are in constant habit of picking their nose. *E. coli* presence is linked to poor hand washing especially after using the toilet also contaminated water used for processing the product is a measure mode of contamination, Iloma et al, (2018). Pseudomonas species were also isolated, an observation in

agreement with the findings of (Edema, et. al., 2008). There is need for monitoring and regulatory agencies to regulates the production of suya in Nigeria. Educating the processors and consumers on good sanitary practices during processing displaying and sale of the products and the possible danger of contaminated products is a major way forward for safe guiding the product consumption.

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