



Original Article

Organoleptic and Microbiological Aspects of Roasted Suya Sold in Selected Stand-Locations in Niger Delta, Nigeria

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ABSTRACT

The organoleptic and microbiological aspects of suya was carried out to assess the level of microbial contamination of roasted suya sold in selected stand-locations in Ozoro headquarters of Isoko North Local Government Area of Delta State. The suya samples were analyzed for total viable bacteria conform and mould. It was also subjected to organoleptic assessment for flavour and aroma, texture, appearance and palatability (taste). The results indicate that the counts were significantly ($p < 0.05$) higher in cold roasted suya than hot roasted suya. The high counts are indications of low temperature applied during processing and poor hygienic practices which could be through handling of suya using dirty hands, sneezing or coughing, dirty tables and utensils. The results also revealed that there was no conforms detected among the stand locations. A significant improvement in the sensory panel evaluation scores for flavor and aroma, appearance. Texture has been observed. Reheating of roasted suya after purchase before eating will therefore reduced pathogenic micro-organisms that can cause diseases to mankind.

Keywords: Organoleptic, microbiological, suya, flavor and aroma, pathogenic, texture.

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INTRODUCTION

Meat processors in developing countries especially those with tropical climate cannot rely solely on refrigeration or freezing methods to preserve the meat products. Because of the unfavorable meat handling conditions, inadequate electric power supply and high cost involved in refrigeration/freezing, roasted suya (tsire) provides more than the usual characteristics color, flavor and aroma, and texture. Visser and Thomas (1987) report that flavor, texture and appearance are the most important characteristics of food (meat) because they are attributes, the consumer can readily assess.

Suya is one of the ready-to-eat indigenous Nigeria meat snacks which is processed, served or sold along streets, junction, in club houses, at picnics, restaurants, and within institutions (Ikeme, 1990). The tremendous growth in the production and consumption of suya product has excited a great deal of concern regarding the microbiological quality of these

products. Igene and Abulu (1984) evaluated the bacterial characteristics of suya (*tsire*) from the point of view of *tsire*-stand-location (environment) and storage conditions during preparation and retail and report that the total bacterial and coliform counts in the *tsire* product exceeded acceptable limit for delicatessen items. Thus, suggesting unsanitary conditions.

They observed that the level of micro - organisms in the product was significantly ($p < 0.01$) related to handling E ; the retail level. Identification of the bacterial genera in the *tsire* product revealed the presence of *Bacillus*, *Streptococcus*, *Proteus*, *Staphylococcus*, *Escherichia*, *Pseudomonas* and *Klebsiella* in the raw/unroasted product and *Bacillus*, *Streptococcus*, *Staphylococcus* and *Klebsiella* in fleshy roasted product. With the exception of *Pseudomonas*, all the other six genera were present in the roasted *tsire* stored for 24hours (cold) while only three genera, *Bacillus*, *Klebsiella* and *Staphylococcus* were found in roasted product stored for 24 hours and reheated.

In terms of quantitative relationship, it was reported that *E. coli* constituted more than 3 0% of the isolates in stored raw *tsire* as well as in roasted *tsire* while *Bacillus*, especially *Bacillus coreus* represented about 20 – 25 % of the total isolates and was found in most treatments. Also faecal coliforms were found to be highest in the raw/ unroasted product and Jess in the roasted stored for 24 hours but reheated. Freshly roasted *tsire* had no coliforms. Similar results were reported by Igene (1983). The objective of this study was to assess the level of microbial contamination of suya in selected stand - location of Ozoro, and also to assess the organoleptic properties of suya (*tsire*).

MATERIALS AND METHODS

Suya (*tsire*) were purchased from three randomly selected stand locations in Ozoro main town (SL - Ala - Square - SL₂ - Westin Hall Club and SL - Iwhelogbo Junction) respectively. A total of thirty samples of 50 g each were collected from selected stand-locations at intervals of 5 minutes each. The populations of the various groups of micro-organisms were determined by the procedures described by ICMSF (1978). Nutrient agar and MacConkey agar were used for total aerobic bacterial and coliform counts respectively. The roasted suya was subjected to assessment for flavor and aroma, texture, appearance and palatability (taste) as described by Igene (1983). Fifteen randomly selected persons were asked to indicate *tsire* preference for three properties as well as acceptability, and color on a scale of Zero to three as shown below (3 = Very Good; 2 = Good; 1 = Fair; and 0 = Poor).

RESULTS AND DISCUSSION

Data on the microbiological characteristics of the samples (roasted suya) sold in Ozoro at different stand-locations are as presented in table 1 a, b and c during sale. In SL (1, 2, 3,...) ie bacterial count increased from 5×10^3 to 40×10^3 and 15×10^3 to 60×10^3 for hot and cold samples with 10 and 30 % levels of roasted suya respectively. For SL₂, about 6×10^3 to 38×10^3 and 20×10^3 to 75×10^3 (hot and cold roasted suya) at the same percentage levels. While in SL₃, the total viable bacterial count increased from 30×10^3 to 35×10^3 and 38×10^3 to 51×10^3 for hot and cold sample ranging from the same levels of percentage.

The trend in mould population was similar to SL₁, SL₂ and SL₃. These observations appear to support the earlier findings of Adelakun *et al.*, (2005). The results have revealed that no coliforms were however detected in any of the samples for the three stand locations, suggesting that all samples might be free of faecal contamination. Similar results were reported by Adelakun *et al.*, (2005) and Igene (1983). The relatively presence of other types of bacterial and moulds might be due to the processing which suya is subjected to. However, the high temperature of roasting is expected to reduce or destroy all micro-organism present. The findings also revealed that the total viable bacterial count and mould count were lower in roasted hot suya but higher in roasted cold suya at the three stand-locations in Ozoro.

Table 1: Microbiological Analysis of Roasted Suya

(a) Ala-Square-Stand-Location (SL₁)						
Sample roasted suya (%)	Total viable count × 10		Coliform Count × 10		Mould count × 10	
	Hot	Cold	Hot	Cold	Hot	Cold
10	5	15	00	00	8	18
15	15	26	00	00	30	32
20	25	35	00	00	60	75
25	36	48	00	00	120	185
30	40	60	00	00	>150	>200

(b) Owhegbo Junction - Stand - Location (SL₂)						
Sample roasted suya (%)	Total viable count × 10		Coliform Count × 10		Mould count × 10	
	Hot	Cold	Hot	Cold	Hot	Cold
10	6	20	00	00	10	20
15	10	28	00	00	22	42
20	15	36	00	00	40	60
25	32	52	00	00	190	260
30	38	75	00	00	>250	>350

(c) Westin Hall Club - Stand - Location (SL₃)						
Sample roasted suya (%)	Total viable count × 10		Coliform Count × 10		Mould count × 10	
	Hot	Cold	Hot	Cold	Hot	Cold
10	3	8	00	00	5	12
15	10	15	00	00	12	25
20	15	22	00	00	26	38
25	30	38	00	00	32	40
30	35	51	00	00	55	80

The properties of organoleptic assessment of roasted suya processed at different stand-locations and their average score are shown in Table 2. The flavor and aroma, of the roasted suya was found to be very good in SL₁ and SL₂. This may be due to the addition of flavoring components like vanilla and others, during processing to enhance its palatability as well as aroma, and thus lead to an increase in its acceptability by consumers. The texture was of good value. The texture of the roasted suya tended towards coarseness- like consistency. This could be attributed to the fact that the degree of excess addition of groundnut milled with pepper. Thus, a rougher particle size of this ingredient would result in the production of suya (tsire). Therefore moderate addition of mixture of groundnut milled with pepper will yield roasted suya of smoother consistency.

The temperature and time used for the roasting also contribute in no small measure to suya appearance; therefore, it is an important factor to consider when suya of a specific color is to be produced as attributes to appearance for consumer attraction. The results obtained from the assessment of flavor and aroma showed a very good score in SL₁ and SL₂ and was found to be better than SL₃. The pleasant aroma of roasted suya came from browning reaction of heat on the meat fats as well as from volatile compounds from the groundnut oil being used.

Table 2: Properties Considered for Organoleptic Assessment and their Average Score

Properties	SL1 Score	SL2 Score	SL3 Score
Flavour and Aroma	3.	1.9	3
Appearance	2.6	2.4	2.9
Texture	2	1.8	2.8
Palatability	2.8	2.4	3
Acceptability	2.5	2	2.7

CONCLUSION AND RECOMMENDATIONS

From the results, it is quite obvious that during roasting, the bacterial population is normally

reduced by the influence of temperature and time. A significant improvement in the sensory panel evaluation scores for flavour, and aroma, appearance, texture has been observed. The sensory characteristics would also be improved by the addition of appropriate flavoring substances. It was, therefore, recommended that consumers should not eat suya when it is cold. It should be reheated at home after purchase with microwave and - or other sources of heat. This will therefore, reduce pathogenic micro organisms that can cause diseases to mankind. Suya retailers should always store their roasted suya in a show glass to avoid microbial contamination after reheated. There is the need to adopt modern techniques of processing suya in our community, state and the nation at large.

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