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Consumer awareness and preference to spices used in meat products

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ABSTRACT

Spices are parts of plants used for their properties to preserve, colour or as medicine. Spices used in processed meat products were identified, described and studied for consumer awareness and preference. Information was obtained through a survey of processed meat product producers, spice merchants and processed meat consumers in Sokoto metropolis. Cluster sampling was used to select spice merchants in Sokoto central market. Snowball and multistage sampling were used to select the processed meat products producers and consumers respectively. The spices identified were ginger, garlic, chilli, nutmeg, black pepper, cloves and alligator pepper. The proportion of the spices used in a spice mix was found to follow the order ginger>chilli>garlic>nutmeg> black pepper >cloves and alligator pepper. Awareness and preference of spices were found to follow the order ginger>garlic>nutmeg> black pepper >cloves>chilli> alligator pepper. Preference for spices differed ($P<0.05$) in all except for chilli and cloves ($P>0.05$) which were preferred equally. There was a positive relationship between awareness and preference.

1. Introduction

Spices play an important and growing role in flavouring of diets that are used all over the world. spices may be derived from different parts of the plant such as bark, fruits, leaves, buds, flowers, roots, rhizomes, styles, seeds, stigmas as well as the entire plant tops. Spices possessed volatile fragrant oils and aromatic flavours. The use and intake of spices is continuously gaining momentum due to its increasing health significance (Kaefer and Milner, 2008). Today, spices production, which is an important trading activity, is majorly controlled by China, Brazil, India, Guatemala, Indonesia and Madagascar (WTO, 2012).

The famous spice author Rosengarten (1969) describes a spice as a product that enriches or alters the quality of a thing, for example altering the taste of food to give it zest or pungency; a piquant or lasting flavouring; or a relish. The term 'spice' is thus used to cover the use of spices, herbs and certain aromatic vegetables to impart odour and flavour to foods. Spices can be used alone or in combination with other spices to impart characteristic flavour and colour to foods (Peter, 2003). They provide micro-nutrients and are used to increase food palatability. Varieties of spices, seasonings and flavourings are used in meat products (Tainter and Grenis, 1993). Spices and herbs have been used for centuries by many cultures to enhance the flavour and aroma of foods. Early cultures recognized the value of using spices and herbs in preserving food as well as their medicinal value (Ghadekar et al., 2006). Hernandez et al. (2014) described spices as having many applications namely as a flavouring agent, medicinal, preservative, colourant and as insecticides. Spices possess antibacterial, antifungal and antiviral activities, they also exhibit antioxidant properties in different food systems. Spices are also used as natural preservatives in meat. Cinnamon can easily replace industrial preservatives which are dangerous to human health. Some spices like coriander, fennel, turmeric and cloves are also medicinal in treating dental and skin problems, glaucoma, insulin resistance and sugar level reduction (worldofspices, 2018).

Carlos and Harrison (1999) found that the major chemical compounds and ingredients in spices include eugenol in cloves, cuminaldehyde in cumin and cinammaldehyde in cincamon which have preservative properties and could help in preventing food from spoilage and inhibit pathogenic activities of micro-organisms. Food preservation is of key concern today given that most of the spices nowadays are based on synthetic chemicals.

The common natural spices used in processed meat are paprika, chilli, pimento, mace, ginger, nutmeg, cloves, cinnamon, thyme, cardamom, cumin, coriander seeds, garlic, ginger, turmeric, black pepper (Heinz and Hautzinger, 2007).

Sokoto State located in the north-western part of Nigeria has an estimated population of 4.2 million (NPC, 2006). Livestock species kept include cattle, camel, sheep goats and poultry. Livestock species kept include cattle, camel, sheep goats and poultry. The state has an estimated number of 1.18 million cattle, 1.98 million sheep, 2.90 million goats, 2 million poultry, 34, 532 horses, 51, 388 donkeys, 1.18 million camels (FAO, 2013).

Processed meat products are produced by many retail outlets in Sokoto metropolis and consumed frequently ranging from Beef jerky (kilishi), meat floss (Danbun nama), roasted meat (Balangu) and skew meat (Tsire). Spices are used in garnishing the processed meat to improve the smell, taste, colour and impart some antioxidant and medicinal properties to the meat products (Gadekar et al., 2006). Common spices in the study area include ginger, garlic, thyme, nutmeg, cinnamon, turmeric, peppers, cloves, and bay leaves. Spice trading is an emerging business in the study area with a considerable number of spice traders who sell to the meat processors.

The use of spices in processed meat products is very common in Sokoto metropolis, in fact, it could be said that there is hardly any processed meat product without spices added to it but there is a scarcity of information on the types, awareness quantities and preferences of the spices used. The information provided by this work may eliminate this problem and bridge the information gap between the processors and the consumers. The broad objective of this study is to examine consumer awareness and preference for spices used in meat products in Sokoto metropolis while specific objectives of the study are to:

- ✓ Identify types of spices used in processing meat products in Sokoto Metropolis
- ✓ Assess awareness of types of spices used in processing meat products in Sokoto Metropolis
- ✓ Evaluate preference for spices used in the processing of meat products in the study area.

2. Materials and methods

The study was carried out in Sokoto located in North-western Nigeria near the confluence of the Sokoto River and Rima River. Sokoto has an estimated population of 4.2 million (NPC, 2006). Sokoto state is in the dry Sahel

surrounded by sandy savannah and isolated hill with an annual average temperature of 23.8 ˚C, maximum daytime temperatures for most of the year is generally under 40 ˚C. Most of the populace are crop farmers and practice sedentary animal husbandry.

2.1. Sampling and sampling procedure

The study was a survey work conducted with the aid of a checklist questionnaire. The three categories of the respondents interviewed were; processed meat manufacturers, the spice merchants and consumers of processed meat products.

Multistage sampling was employed to obtain information from the respondents of processed meat in Sokoto metropolis. Sokoto metropolis in this study consist of 5 Local Government Areas (Sokoto North, Sokoto South, Wamakko, Dange-Shuni and Kware) were selected purposively in the first stage. In the second stage, different wards were selected from the local governments proportionately while in the third stage, the consumers were selected conveniently.

2.2. Data collection and data analysis

In the collection of the data, a checklist was employed. Data from the consumers, processors and the meat merchants were all descriptive. The consumers were asked what spices they know and were asked to rank them according to their preferences using numbers. The processors were asked the spices they are aware of, the type they use in their products, and the quantities they use in their various meat products.

The spice merchants are also asked what spices they know, which ones they have in stock and if they sell spice mixes and the quantities that make up a mix, a weighing scale was then used to measure each spice in a mix. The interviews were conducted in a fairly open framework to allow for focused, conversational two-way communication.

The data collected were analysed using descriptive statistics. For identification, the spices were listed with local, common, botanical and family names and then described by colour, appearance, nature, part of the plant it comes from, flavour, shape and size.

The consumer knowledge on spices was determined and calculated into a percentage, the spices were also ranked by consumers according to preferences using General Linear Model Univariate procedure of IBM SPSS (2016) Statistics for Windows, version 24 software and significant means were separated using Duncan Multiple Range Test.

3. Results and discussion

The major spices used in processed meat products *balangu*" (roasted meat), "*kilishi*" (beef jerky), "*danbun nama*" (meat floss), "*tsire*" (skew meat) are ginger, garlic, cloves, nutmeg, chilli, alligator pepper, and black peppers with varying appearance, sizes and shapes that has flavour range from spicy pungent to aromatic and hot (Table 1).

Table 1
Proportion of spices g/100g.

Spice	Proportion per 100g (g/g)
Ginger	53.89
Chilli	19.98
Garlic	12.63
Nutmeg	5.88
Black pepper	4.58
Cloves	2.42
Alligator pepper	0.61
Total	100

Source: field survey (2019).

All consumers of processed meat products consumed in Sokoto are aware of a number of spices and entirely (100%) of the respondents were aware of ginger and garlic in their community. However, only half (50%) of the

respondents were aware of alligator pepper as a spice and thus, had the least awareness level in the study. Also, nutmeg, cloves and black pepper had average awareness level by the respondents.

Table 2 shows the preferences for the spices also differ ($p<0.05$) as ginger and garlic were the most preferred. Alligator pepper had the least preference, averagely preferred are nutmeg, cloves, black pepper and chilli, although chilli and cloves are preferred on an equal basis.

Table 2
Awareness and preferences for spices used in meat products in Sokoto Metropolis.

Spice	Awareness (%)	Preference
Ginger	100	4.46[a]
Garlic	100	3.99[b]
Nutmeg	76.7	2.63[c]
Black pepper	67.5	2.18[d]
Cloves	66.9	1.91[e]
Chilli	65	1.72[e]
Alligator pepper	50	0.95[f]
	SE	3.02

[abcdef] means bearing different superscript along the same column differ (P>0.05).

Ginger, Chilli and Garlic are used in a higher proportion than the others such as nutmeg, black pepper and cloves. However, alligator pepper is used the least according to the findings of the present study. Ginger, chilli and garlic have the largest quantity of all the spices probably because they are the most popular and cheapest spices found in Sokoto. Ginger is largely grown in Nigeria and according to FAO (2013), ginger is a widely grown spice and Nigeria is the third largest ginger producing nation. Chilli and garlic are not only grown but also in high quantities in Sokoto state of Nigeria (Dawang et al., 2016).

Nutmeg is added in smaller quantities probably because it has an intense acrid aroma and if used in higher quantities it could surpass the aroma of other spices. Koleosho (2014) reported that a little quantity of the nutmeg is usually enough so that the fragrance does not overpower other flavours of food due to its very powerful aroma.

Zachariah and Parthasarathy (2008) reported that black pepper is very spicy due to its chemical component “piperine”. Thus, based on our findings, Black pepper is added in smaller quantities, less than nutmeg probably because it is very spicy and most consumers in Sokoto do not like excessively spicy foods. According to Ene-Obong et al. (2018), some spices are specific to certain locations and their usage is based on preferences and cultural food habits. Despite their popularity in traditional cuisine, these spices are hardly found in national and regional food composition databases probably due to the fact that spices were considered as non-nutritive components of food (Kaefer and Milner, 2008).

Cloves and Alligator pepper are added the least probably because they are bitter and if added in higher quantities, they could make the food bitter. Bhide (2011) reported that raw cloves have a camphor-like aroma and are bitter which could result in overpowering other flavours in food. Similarly, Okoye (2018) reported that alligator pepper has small dark seeds with bitter, pepper flavour.

This study has established a relationship between awareness and preference, the spices the consumers are most aware of are the most preferred and the one they are least aware of is the least preferred.

Ginger and garlic are the most popular and have the most awareness probably because of familiarity, they are seen more often. Mulderij (2017) reported that in Nigeria, the popularity of ginger is high, not only for fresh but for the dried and powdered product too. Muhammad (2017) also reported that garlic is one of the most popular sought-after spice in Sokoto state.

Alligator pepper had the least awareness probably because it has very low popularity and it is not cultivated in the region majorly because the climate is unsuitable. Norman (1990) reported that Alligator pepper is a rainforest understorey plant grown best partially in shade.

Ginger and garlic are the most preferred probably because of their variety of uses (food and health), and in the many forms, they can be attained. Purseglove et al. (1981) reported that ginger and garlic are available in many forms such as dried, fresh, powdered, brined, and pickled. Pruthi (1987) reported that apart from food uses,

ginger and garlic have other uses such as treatment of ailments, stomach upset, diarrhoea, nausea and aid digestion.

Alligator pepper is least preferred probably because of health reasons and its bitter taste. Okpala (2016) reported that the seeds of alligator pepper have a sharp peppery flavour, it is bitter. Inegbenebor et al. (2009) and Uloneme et al. (2014) also reported that consumption of alligator pepper has negative health implications in pregnant women and lactating mothers.

Chilli and cloves are preferred equally probably because they serve different functions and complement each other in food, cloves for its aroma and chilli for its spiciness. This is in according to the study by Alma et al. (2007) who reported that cloves are dry pungent aromatic floral buds and elsewhere (Ghelardini et al., 2001) that chilli is known for spiciness and bright colour.

The relationship between awareness and preference in spices is probably due to the fact that the consumer has to know a spice before preferring it to another. This is in agreement with the report of Soethout et al. (2008) who established relationship (correlation) between knowledge and preference.

4. Conclusion

The most common and most preferred spice in processed meat products is ginger, chilli and garlic which is also the spice with the largest portion spice mix for processed meat products, the least popular and least preferred is alligator pepper. Cloves and chilli are preferred equally. There is a positive relationship between awareness and preference.

The study recommended exploration and use of more spices in meat processing in the study area especially with reference to the complementing relationship between spices. Also, given the high microbial and antioxidant properties of spices used in the study, there is a possibility of research to explore its use in other food preservation.

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