

CONSUMER PREFERENCE FOR SWINE OFFALS AND ITS HEALTH IMPLICATIONS IN KUMASI, GHANA

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ABSTRACT

Global meat consumption rate had doubled in most countries over the last five decades. In Ghana, total animal production has also increased over the last decade with consumption of pork and its offals becoming prominent. Therefore this study aims to evaluate factors that influence consumer preference for pig offals and the associated public health risks. One hundred (100) respondents in the Kumasi Metropolis were randomly selected through structured questionnaires and samples of offals randomly collected, sectioned, processed and examined for any histopathological indicators. Data collected were analyzed through the use of descriptive statistical tools. The results showed that edible offal preferential consumption exist within the increasing demand and value supply chain with the liver (32%) and stomach (23%) being the most preferred offal. Factors such as nutritional value, delicacy, availability, cost and level of education are noted to influence the purchasing power and preference of consumers. The consumers are less conscious regarding the risks stemming from the common zoonotic diseases and health concerns. Histological assessment of the most preferred offals (liver) showed no remarkable histopathological changes. Based on this, the preference for pig livers may not be associated with considerate health risk.

Keywords: Consumer, Histopathology, Kumasi, Pig offal preference

INTRODUCTION

Meat is a term most often used to describe the skeletal muscle tissue of an animal meant for consumption. It is mostly composed of roughly 75% water, 20% protein, and 5% fat, carbohydrates, and assorted proteins. Meat is not homogeneous as different types of meat vary in composition depending on the source and fatty acid composition (De-Smet *et al.*, 2002).

Meats have been reported to be high in nutritional value ranging from amino acids, vitamins, minerals, anti-oxidants such as ubiquinone among others. As such, reports have

showed that over the last five decades, meat consumption rate in some countries such as China have doubled, while other have shown significant increase in meat consumption per capital. Although Ghana showed a slight meat consumption per capital drop from 10.6 % to 9.9 % within the same period of review while total meat production had increased from 77,723 tonnes in 2001 to 244,742 tonnes in 2010 (Brown, 2009; Adzitey, 2013). Pork meat is known to be the fourth most consumed meat type after game, chicken and beef respectively. However, with a population growth rate estimate of 0.912% as at 2013, a population density growth of 36 persons per square

kilometer in 1970 to 78 persons per square kilometer in 2012 (Wikipedia, 2015; Ghana Embassy, 2015; World Bank, 2015), and growing global concerns for wildlife conservation, the bulk of meat type readily consumed by Ghanaians is gradually drifting away from wildlife to other meat sources (chicken beef, pork respectively) over the last decade (Adzitey, 2013).

Moreover, due to this observed increased trend in global and local meat consumption, associated health risks from both infectious and non-infectious diseases have been on the rise such as Creutzfeldt-Jakob disease, colorectal cancers, helminthosis, cardiovascular diseases, macular eye degeneration (Engelking, 2015) among others. Hence there is a gradual increase in demand for meat offal both globally and locally.

Meat offal, additionally called assortment or organ meat is a summative term used to describe meat from smooth muscles and internal organs such as guts gotten from butchered animal carcasses which includes liver, digestive tracts, lungs, heart and kidney. Offal is a vast reservoir of vital amino – acids, vitamins, minerals and of some miniaturized scale supplements, in that, they have a higher bioavailability which can barely be adjusted for by plant-derived pro vitamins (Biesalski, 2005).

However, the public health implications of pig offal could mask the nutritional benefits especially in a developing country such as Ghana where issues of meat safety and quality have not received needed attention as compared to developed countries and has such resulted in reemergence of some zoonotic infectious diseases (Adzitey, 2013). The incidence of offal-borne diseases continues to adversely affect the health and productivity of people in the country and beyond. Offal could be a source of some zoonotic diseases such as cysticercosis, brucellosis, fascioliasis, tuberculosis and others as it is often consumed under cooked (Phiri *et al.*, 2006).

To this end, this study was designed to assess factors that tend to influence consumer preference for offal across major determinants such as occupational, educational and tribal

background and to access the associated potential risk.

MATERIALS AND METHODS

Study Design: The survey is a cross-sectional study, which sought to evaluate the preferential consumption of pig offal and associated diseases in the various retail markets in the Kumasi metropolis. Structured questionnaires were administered to 100 consumers of pig offal who were randomly selected prior to sample collection. Based on data from preferential consumption survey for specific pig offal, samples of such were collected from selected butcher shops and vendors within the metropolis for histopathological assessment.

Study Area: The Kumasi metropolis has an area of approximately 254 square kilometers and is located between latitudes 6°03'5" and 6°04'4"N and longitudes 1°03'0" and 1°03'5" E (Figure 1). It was purposely selected because it is a densely populated city with non Muslim working class who have the means to afford animal protein. The city plays a major role in the food chain of Ghana as compared to the northern region of Ghana where greater percentage of its population are Muslims and often pigs produced within the northern area are sent down to Kumasi where it has a ready market. 50 – 60% of pigs in Ghana are concentrated in the Ashanti and Brong-Ahafo regions of Ghana and over 90% of this lot is made up of Ashanti black pigs (Frimpong *et al.*, 2012).



Figure 1: Map showing the various locations in Kumasi metropolis (Wikipedia, 2015)

Study Population: Adult grown-up members who demonstrated preference for pig offal were subsequently selected for this investigation, also included are sellers of the offal within Kumasi metropolis. Pig offal especially the livers used for histological assessments were obtained from randomly selected retailers or merchants in the Kumasi metropolis.

Sample Size Determination: The sample size required was determined using the formula: $n = t^2 \times p(1-p)/m^2$, where n = required sample size, t = confidence level at 95% (standard value of 1.96), p = estimated prevalence in the project area was estimated at 5% (0.05) since there was no previous report on the condition in Ghana and m = margin of error at 5% (standard value of 0.05). Therefore, $n = (1.96)^2(0.05)(0.95)/0.05^2 = 73$. The adequate sample size is 73 and 100 respondents were sampled.

Experimental technique: The sampling lasted for five (5) months and a total of one hundred (100) well-structured questionnaires adapted from previous study with offals or ruminants (Ayroe *et al.*, 2016) was modified, pre-tested and administered as a tool for evaluation of the preference of selected participants to swine offals. The respondents' data was collected and analysed for preferential consumption of such offals.

Histopathological Assessment: The most preferred pig offal samples (liver) were randomly collected from various retail points and preserved in 10% buffered formalin, routinely processed and stained with Haematoxylin and Eosin (H&E) for histopathological evaluation using light microscopy (Dellman and Brown, 1987).

Data Analysis: The data collected was analysis in percentages utilizing the Statistical Package for Social Sciences (SPSS) version 20.0 suits and Microsoft Office Excel was used in the plotting of graphs.

RESULTS

Educational Impact on Preference: The educational background of respondents had impact on preferential consumption with reference to traditions and their purchasing power. Education plays a very important role in the preference of the various pig offals which is in cognisance of the health implication of the offals to the consumer (Figure 2).

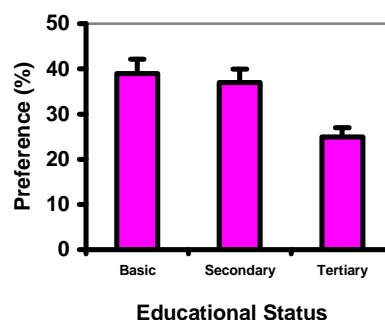


Figure 2: Effect of educational status on preference of pig offals in Kumasi, Ghana

The Source of Pig Offal: The fundamental sources of retail offal among others include open market (49.0%), butchers shop (39.0%), own animal (3.0%) and the super market (9.0%). Pig offals were comparatively cheap and the proximity of offals access point to the consumer defines the patronage of the offal (Table 1).

Table 1: Major sites for the purchased of swine offals in Kumasi, Ghana

Where do you often get your pig offals	Frequency	Percent
Open market	49	49.0
Butchers shop	39	39.0
Super market	9	9.0
Own animals	3	3.0
Total	100	100.0

Specific Preferential Consumption of Offal: Despite the fact that buyers of pig offals were from different walks of life, with different foundations, special utilization of offal exists among the respondents in Kumasi. Many respondents showed strong preference for the liver (32%) however, the heart was the least preferred offal accounting for 3% (Figure 3).

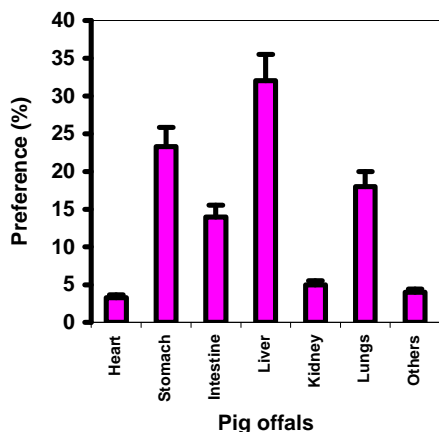


Figure 3: Consumer's preference of pig offals in Kumasi, Ghana

The reasons assigned by respondent for their preferences were nutritional value 41%, delicacy 53% and cost 5% (Figure 4). It implies that the cost factor has little influence in the purchasing of the offal. However, the nutritional value and the delicacy appear to have an influence on the offal purchase.

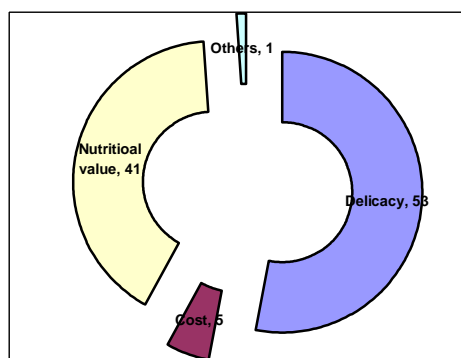


Figure 4: Consumer's reasons for the preference of pig offals in Kumasi, Ghana

The Occupation of Respondent: The results revealed that traders consume pig offals the most as they constitute (20%) of the respondents while house wife, farmer, teacher with a percentage of 15%, 13% and 11%, respectively (Figure 5). It is known from this study that delicacy, nutritional value and the traders' proximity to the pig offal sales points do influence the purchase of offals from the cold stores and only occasionally visit to the other offal sales points.

Tribe Influence: Out of the 100 respondents, Ashanti (19%), Frafra (17%), Akan (18%) tribes were the highest (Figure 6). As a result of the

choice of study area, the Ashanti including Akan were in the majority among the 100 sampled respondents chosen; therefore tribe influence may not be ascertained in this investigation.

Pathological Assessment: Majority of the pig livers examined were apparently normal with one representing 1% showing milk spots which is associated with larval migration. The photomicrograph of the normal and the gross picture of that with milk spots are presented in Figure 7.

DISCUSSIONS

This investigation evaluates consumer preference of pig offals in Kumasi. In this study it was observed that preferences for offal do not always coincide with the actual dietary and food consumption pattern of the respondents. The preferred offal was the liver which further showed that the level of education positively impacted on the preference as most respondent were influence by knowledge of the delicacy and nutritional value than cost (Ayroe *et al.*, 2016).

In this study also, it was observed that the source of the offals was more from the open market than butchers or supermarket which showed that accessibility, varieties and affordability of the offals in the open market might have accounted for the preference observed hence the consumers' proximity to the pig offal sales points and affordability of offals may influence the purchase of offal from the cold stores as described in similar study in ruminants (Ayroe *et al.*, 2016).

The preference shown in the study differ from similar studies with ruminant offals where forestomach was the most preferred (Ayroe *et al.*, 2016), the forestomach of goats or cattle gives varieties than that of pig.

The occupation of respondent also positively influenced the choice for the liver as most of the respondent are experienced and are aware of the nutritive value than other offals. In a similar study from Ghana on the preference of offals from small ruminants, occupation of the respondents had correlated positively with preference (Ayroe *et al.*, 2016).

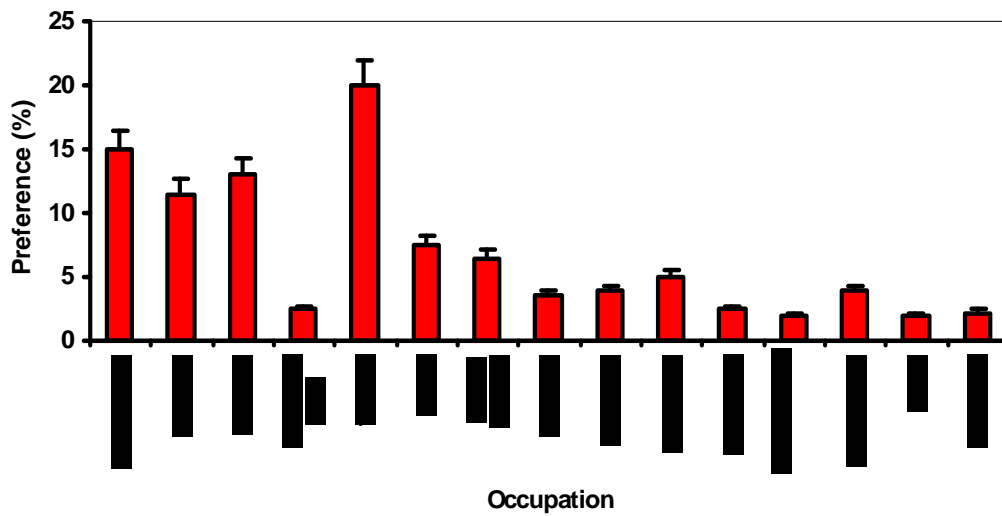


Figure 5: The influence of occupation on preference of pig offals in Kumasi, Ghana

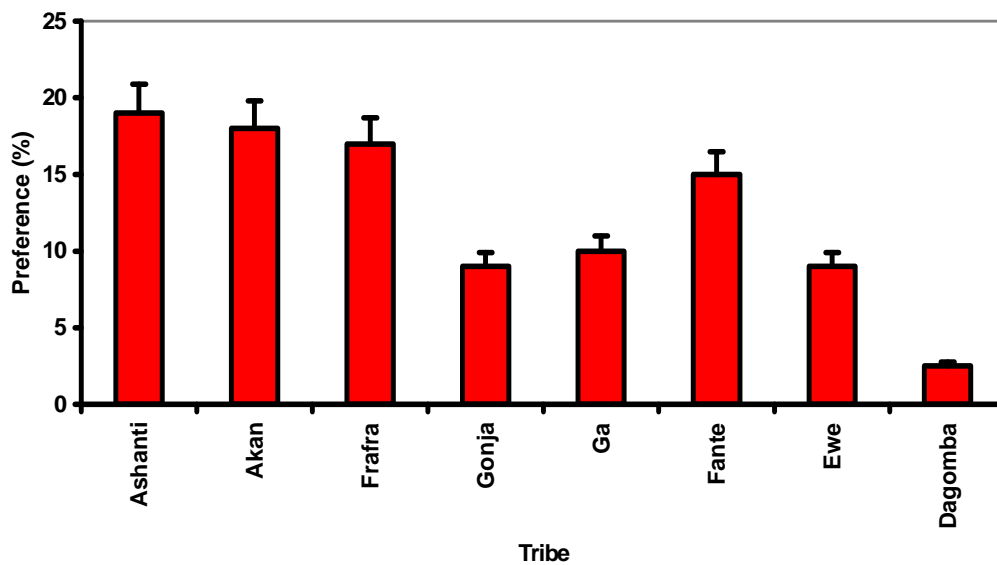


Figure 6: The influence of tribe on preference of pig offals in Kumasi, Ghana

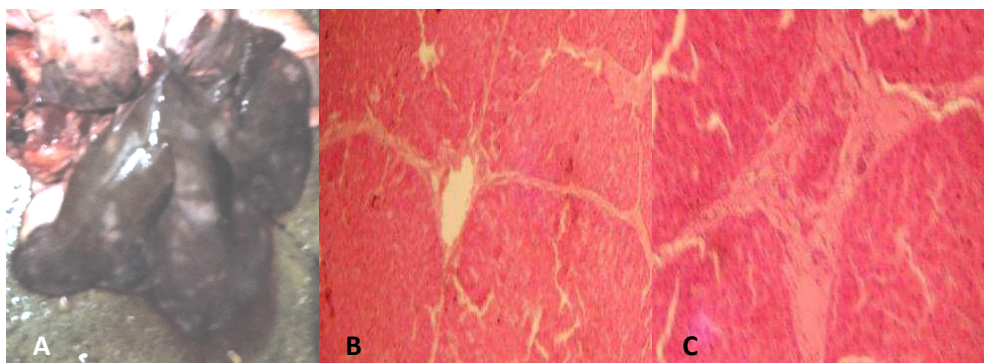


Figure 7: Gross and histopathological assessment of the most preferred offal (liver). Gross picture of the liver with milky spots (A) and photomicrograph of tissue section stained with Haematoxylin and Eosin (B and C) showing a normal liver. Mag. x 100

The tribal influence may not be easily ascertained as a result of the choice of study area where the Ashanti including Akan constituted the majority of the respondents.

The pathological assessment of the most preferred offals also revealed that hepatic abscess associated with milk spots is not commonly encountered as most of the histological screening of the tissue revealed no significant pathological change hence it could be that livers from pigs in this area of study are safe.

Conclusions: This survey revealed that preferential consumption of pig offals exists within the Kumasi Metropolis. Preference for offal does not generally concur with the genuine dietary and sustenance utilization design. Various variables informed the purchasers' inclination for the stomach (23%) and the liver (32%) which was the preferred consumable offals in this study. Delicacy, taste, nutritional value and educational background were noted to play a role in the buying force and inclination of purchasers. Histopathological assessment revealed no conceivable risk connected with the consumption of the most preferred of offals (liver). Based on this assessment, it is strongly recommended that pig offals especially liver should be patronize by consumers since its health risk are minimal.

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