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Research Article

Study on Consumers Preference and Acceptability of Meat Pies Made From Beef and Broiler Chicken Meat

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ABSTRACT

The study was carried out to evaluate consumers' preference, acceptability, and sensory attributes of pies made using beef and broiler chicken meat at the Animal Product and Processing Laboratory of the Department of Animal Science, Federal University Dutsin-Ma. Sixteen (16) trained panelists were used to examine the sensory attributes preference and acceptability of the pies using a five-point hedonic scale. Data obtained on saltines, appealness, flavourness, aroma, tenderness, juiciness, and overall preference/acceptance were analysed using a general linear model of the SPSS version 2016. The results show that 26% of the respondents perfectly accepted the pie made using beef while only 23% of the respondents perfectly accepted the pie made from broiler chicken. There were no significant differences ($p<0.05$) in preference and sensory attributes of pies made from both meat sources. It is concluded that beef pie had more acceptability than broiler chicken pie.

Keywords: Pie; Beef; Chicken Meat; Preference; Acceptability

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INTRODUCTION

Evidence exists to show that meat has served as a food source for humans for thousands of years Bunn, 2007). Animals such as red deer (*Cervus elaphus*) and bison (commonly known as buffalo in North America) have served as sources of hide, bone, and meat for more than 500,000 years (Kolipinski *et al.,* 2014). Humans have consumed meat throughout history because of meat's sustenance qualities and because it is recognized as an important source of essential amino acids (proteins), iron, B vitamins as well as other nutrients and minerals. Originally, humans hunted animals for meat and non-meat products, but today, animals used for food and sold into commerce are slaughtered under strict guidelines from various governing agencies (Leroy *et al.,* 2023). These agencies ensure the animals are put to death in a humane manner and also ensure the animals are free of disease at the time of death and the carcasses are kept clean throughout the dressing process to provide wholesome products for consumption (Vialles, 1994). The portions of the animal consumed as food are collectively referred to as meat. Even so, other animal products such as milk and eggs are also derived from animals, but they are not considered meat (Westhoek *et al.,* 2011). The definition of meat varies based on application. As an example, the Merriam Webster dictionary simply defines meat as "animal tissue especially as food" (Merriam and Webster 2017). The code of federal regulations goes a step further and specifically includes the tongue, diaphragm, heart, and oesophagus as meat products. The

American Meat Science Association (AMSA). Meat is skeletal muscle and its associated tissues derived from mammalian, avian, reptilian, amphibian, and aquatic species commonly harvested for human consumption. Edible offal consisting of organs and non-skeletal muscle tissues also are considered meat. Meat is important for a balanced diet because it is a good source of essential amino acids and micronutrients required for regulation of energy metabolism (Biesalski, 2005). In general, meat pie contain ground meat as the main ingredient, and consists with two parts which are Pie crust and pie fillants. Pie crust is prepared from wheat flour which contains high amount of gluten (Peter *et al.,* 2019). Throughout the world, poultry meat consumption continues to grow, both in developed and in the developing countries. In 1999, global production of chickens reached 40 billion, and by 2020 this trend is expected to continue to grow, so that poultry meat will become the consumers' first choice (Bilgili 2002). Fresh chicken meat and chicken products are universally popular. Good rating of poultry meat is influenced by many factors, such as short fattening duration, excellent space utilization, high reproductive ability of poultry, excellent feed conversion, satisfactory nutritional value of poultry meat, and relatively low sales prices. The quality of broiler meat is affected by a number of factors: fattening system, duration of fattening, hybrid and sex, feeding treatment, handling before slaughter, freezing of carcasses, and storage time (Kralik and Petrak, 2018). The increase in broiler production signifies an increase in the availability of broiler meat and utilizing such meat for broiler pie will help in reducing problems associated with storage of the broiler meat, the overgrowing of the broiler birds with high cost of feeding but low economic returns, cardiovascular problems related to consumption beef pie and finally the actualization of broiler pie will provide alternative to meat pies usually made from beef.

MATERIALS AND METHODS

Study Area

The study was conducted in the Animal Product and Processing Unit of the Department of Animal Science Federal University Dutsin-ma. Dutsin-ma is a Local Government in Katsina State located in North-western Nigeria having a geographical indices of latitude 12°27''18' North and 7°29"29' East and 605 meter above sea level. The area has a prevalence of ruminant animals in the rural communities with an estimated population of 59,022 as at 2007. The rainfall ranges between 700mm to 900mm occurring annually with distinct wet season between May and September and a dry season between October and April.

Experimental Materials

The experimental materials includes, oven, meat grinder, flour mixer and another primary ingredient such as salt, spices, *Sodium monoglutamate*, Irish and potato were all purchased at Dutsin-Ma Market.

Sample Preparation

4kg of both beef and broilers meat was mixed with 1/2kg of Irish potatoes grinded using a meat grinder and kept in two separate bows. 45g of pepper, 250g of flowers, 5g of table salt, 10g of magi, 110g of fresh grated onion, and 65g of cooking oil and10g of baking powder were added to the two separate samples of meat in equal proportions. The pies were stuffed in to the casing for shaping and place into an oven set at 80°c for 25 minutes.

Data collection

The meat pie samples were presented to a group of semi-trained panels, and the personnel examined the samples using a five-point hedonic scale and a quantitative descriptive analysis scale.

Data Analysis

All data obtained on consumer acceptability was analysed using descriptive statistics while preference and sensory attributes were analysed using the General linear model of the SPSS version 2016 and means were separated using Tukey.

RESULTS AND DISCUSSIONS

Consumer Acceptability of Beef and Broiler chicken Meat Pie

The result shows the Consumer acceptability of beef and broiler chicken pie, which indicates that 26% of the consumers accepted beef meat pie perfectly while only 23% of the Consumers perfectly accepted the meat pie made using broiler meat as shown in Table 1. Table 1, above indicate that the pie made from beef is higher acceptability than that made from broiler chicken meat. This might be due the possibility of the consumer familiarity to beef pie rather than the broiler chicken pie also it may be due to beef been the must available and must consumed meat by consumer which is in line with (Connor *et al.*, 2013) stating that the most accepted meat was that from heifers and young bulls.

Consumer preference of beef and broiler chicken pie indicate that the consumer consumer's had same preference for both pies as seen in Table 2.

The results obtained in Table 2 indicate that consumers had same preference for both pies. This may be due to the fact that all ingredient utilized are the same it is just the meat type that differs making it possible to be similar. The overall results indicate a very close competition between the two products, with neither one clearly outperforming the other which may be attribute to the both meat

having good flavour, texture and other sensory attributes. This is in line with the findings of (Pereira and Vicente 2013) who show that meat with good flavour and good taste has a higher preference level. Consumer sensory attributes of beef and broiler chicken meat pie indicate that of all the sensory attributes studied, there was no significant ($P< 0.05$) across all the attributes as seen in Table 3. The results obtained in Table 3 for consumer sensory attributes for meat pie made from beef and broiler pie from chicken indicate that there is no significant difference in all the Sensory Attributes tasted.

Table 1. Consumer Acceptability of Meat Pie made from Beef and Chicken

Treatment	TUA	SUA	ACCP	PAA
Beef Pie (%)	0.0	3.3	20	26
Chicken Pie (%)	3.3	0.0	23.3	23

Key: TUC =Totally Unacceptable, SUA= Slightly Unacceptable, ACCP= Acceptable, PAA= Perfectly Acceptable

Table 2. Consumer Preference for beef and broiler chicken meat pie

Treatment	Score
Beef Pie	1.47
Chicken Pie	1.53
Standard Error	0.13

Table 3: Consumer Sensory Attribute

Parameters	Saltines	App	Flavour	Arm	Tenderness	Juiciness
B.P	6.22	8.16	8.38	6.91	7.97	5.86
C.P	4.70	7.02	7.42	6.19	6.44	5.26
S.E	2.49	2.3	2.35	2.25	2.19	2.18

Key: App=Appealness, Arm=Aroma

The chart above had saltiness of 6.1% meat pie made from beef while a chicken pie had a saltiness of 4.5% which indicates that consumers felt the saltiness in beef pie than in chicken pie because the beef is generally known for its flavour and tenderness, which may be more appealing to consumer. Even though all the saltiness attributes are not significant. This is in line with the findings by (Matarneh *et al.,* 2021). All subjects recorded the same perceive preference for salt, in terms of its importance and its utilization in day to day activities, also the importance of salt cannot be over emphases since it is well utilized by subjects as a flavour enhancer reported by Gillette (2004). Salt tends to improve the flavour intensity food and meat product and it also provide a binding effect in meat (Vicente and Pereira, 2024) making it more tender and palatable hence increases it preference in human.

The results in Figure 2 shows that the consumers find meat pie made from beef had more appealing compared to those made from chicken. The beef meat pie received an appealness rating of 8.2% indicating a high level of attractiveness to consumers. The chicken meat pie had a lower appealness rating of 7.0, suggesting a slightly lower level of attractiveness. The difference in appealness between two types of meat pie could be due to various factors such as taste, texture, flavour, and personal preference. This is in line with the findings of Bilgili *et al.* (2002), stating that beef is generally known for its tenderness and flavour, which might have make it more appealing to some consumers.

Figure 3 shows that the consumer preference for meat pie made from beef had a flavourness of 8.4%, which is higher than that of the chicken with 7.2%, this indicate that a higher percentage of consumer preference of beef - based meat pie compared to the chicken. This might be attributed to the taste and flavour of beef as earlier observed by the consumers and this is in line with findings of Permutual Consultant Report of 2019, stating that individual preference can vary, and these result may not necessarily reflect the overall consumer preference for meat pie.

Figure 4 above shows that the meat pie made from beef has a stronger aroma of 6.9% rating while the meat pie made from chicken has a relatively lower aroma of 5.8% rating. This might be due to beef 's naturally stronger umami flavour profile which is often associated with a more robust aroma as earlier observed by Adams and Akpan (2017) that cooking method such as Browning can enhance the aroma of beef also the use of spices in the beef pie recipe that complement its natural aroma.

Figure 5 shows that the meat pie made from beef has a significantly higher tenderness rating of 8.0% while the meat pie made from chicken has a

relatively lower tenderness rating of 6.5%. This might be attributed to the part of the beef used which may have higher fat making it juicier and tender. Also, the cooking method can break the connective tissue in beef resulting in a more tendered product than that of chicken meat as inadequate or overcooking of chicken can make it tougher (Marchello and Garden-Robinson, 2004).

Figure 6 indicates that the meat pie made from beef has a slightly higher juiciness rating of 5.9% while the meat pie made from chicken has a relatively lower juiciness rating of 5.1%. It's clear that the more the tenderness the more the juiciness just as seen in Fig 5.

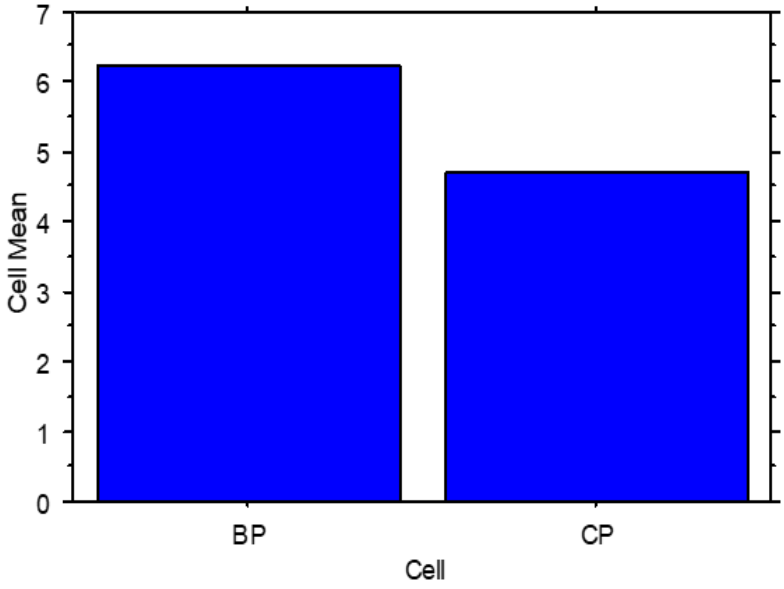

Fig 1. Consumer saltiness for meat pie made from beef and chicken

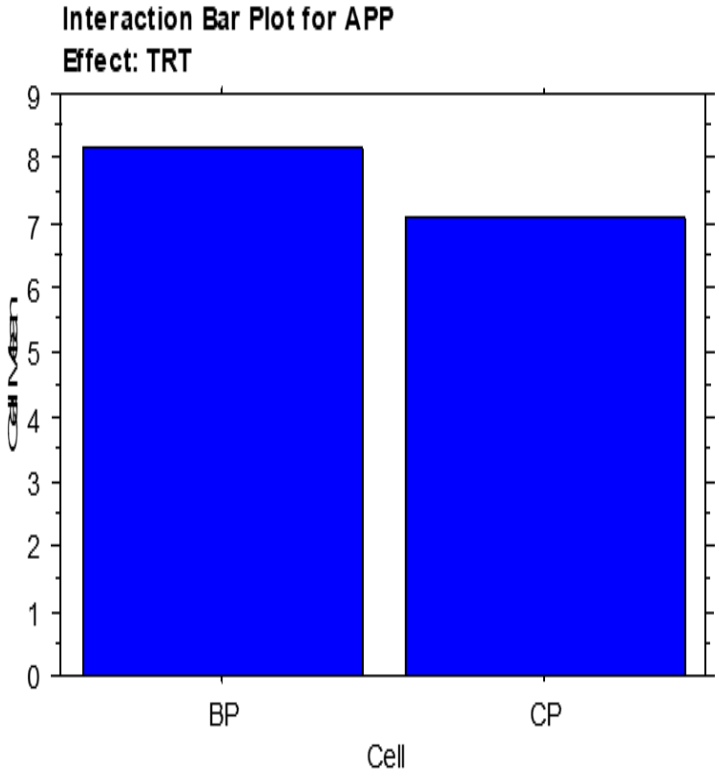

Fig 2. Consumer appealness for meat pie made from beef and chicken

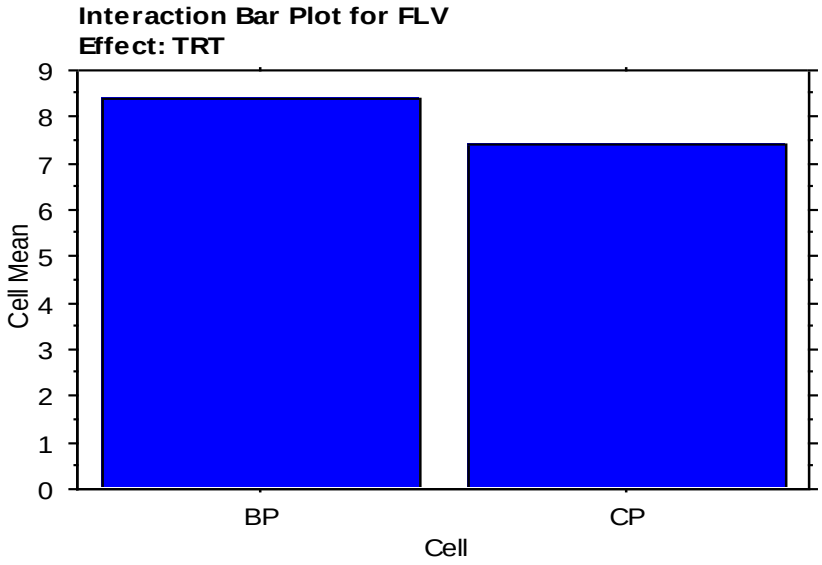

Fig 3. Consumer flavouness for meat pie made from beef and chicken

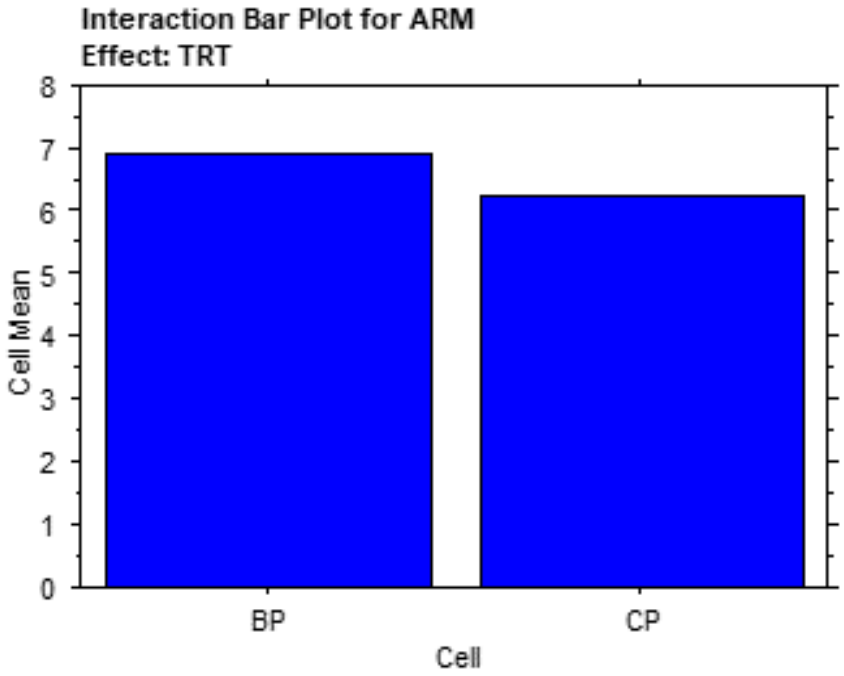

Fig 4 Consumer aroma for meat pie made from beef and chicken

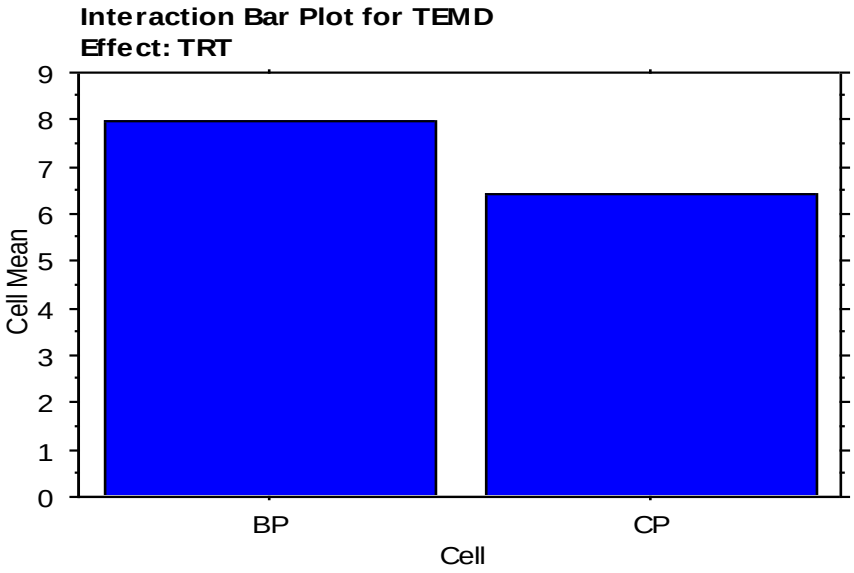

Fig 5. Consumer tenderness for meat pie made from beef and chicken

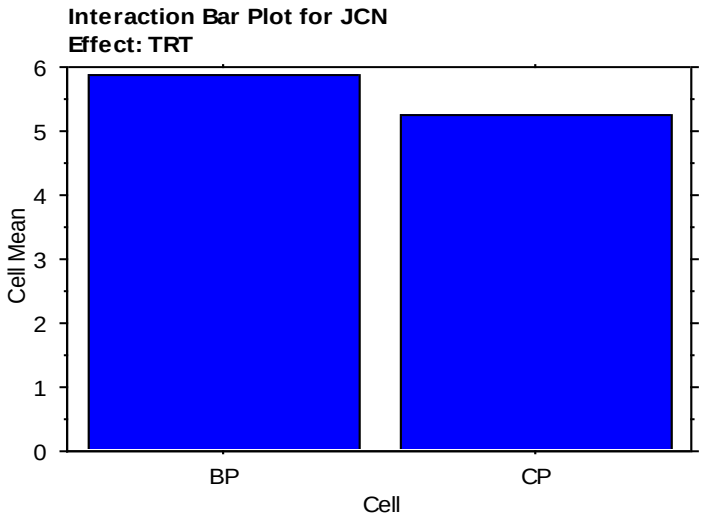

Fig 6 Consumer juiciness for meat pie made from beef and chicken

CONCLUSION

The study concluded that both pies from Broiler meat and Beef have the same sensory attributes and preference although the individual attribute description shows that beef pie had some higher attributes which were not significant statistically. However, broiler pie can easily replace beef pie with the same sensory attributes of consumers. It is therefore recommended that chicken pie should be introduced to the producer as well as poultry farmers in other to reduce the incidence of broiler meat glut.

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