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CONSUMER PERCEPTIONS TOWARDS RABBIT MEAT CONSUMPTION IN DAVEYTON AND ETWATWA AREAS OF GAUTENG PROVINCE, SOUTH AFRICA

Lekgau JN¹, Mthombeni DL^{1*} and MA Antwi¹



Jenifer Lekgau

*Corresponding author email: mthomdl@unisa.ac.za

¹University of South Africa, Department of Agriculture and Animal Health, Florida, Johannesburg, South Africa

ABSTRACT

Consumption of rabbit meat has not penetrated the general populace as a credible substitute for chicken, beef and pork which are the most consumed meat types and widely available in the South African supermarkets. Although rabbit meat has a high nutrition content and good health benefits, it is not yet a commonly consumed meat variety in other parts of the country. This study was undertaken to identify consumers' perceptions towards rabbit meat consumption in Daveyton and Etwatwa area, Gauteng Province of South Africa. A proportionate sampling technique was used to determine the samples for each of the two study areas to select 382 participants from a pull sampling frame of 85000 participants. A semi-structured questionnaire was used to collect primary data by interviewing 382 selected participants. The Statistical Package for Social Science (SPSS), version 28.0, was used to analyse the data. To determine the consumer perception for rabbit meat, a 5-point Likert scale was used. Furthermore, a Principal Component Analysis (PCA) was used to analyse the relationship of the initial variables by extracting significant components. The results of the study showed that 61% of consumers agreed that they do not know where to buy rabbit meat in the study area. When comparing other meat types to rabbit meat in terms of health benefits, freshness, taste, appearance, texture and flavour, 43.6% respondents were neutral. Four PCAs were extracted to be significant and loaded positively indicating that consumers had positive perceptions towards rabbit meat and were represented by: health consciousness, rabbit meat availability, and behavioural considerations; beliefs and social acceptability; social considerations and perception on affordability, and sensory appeal. It is, therefore, recommended that support to the rabbit meat market should be informed by the determinants. The local meat market should initiate more rabbit meat sales in the study area since there is less access to rabbit meat.

Key words: Consumers' perception, rabbit meat, meat consumption, Principal Component Analysis, South Africa

INTRODUCTION

Rabbit meat consumption has been gaining popularity in some parts of South Africa. Despite the high nutritional composition, rabbit meat is not yet a popular substitute for chicken, beef and pork in other parts of the country. According to Noinoi [1], consumption of rabbit meat has not penetrated the general populace as a credible substitute for most commonly consumed meat types. Rabbit meat has been reported to have high nutritional and dietetic characteristics, but its consumption rate is lower than other meat [1, 2]. Rabbit meat has been recommended as a good source of protein which can alleviate animal protein inadequacies in developing countries [3, 4]. The nutritional profile of rabbit meat by comparison with beef, pork and poultry is attributed to the relatively higher proportions of fatty acids and low amounts of intramuscular fat, cholesterol and sodium, which indicates that the rabbit meat may provide health benefits to consumers [2].

Rabbits have a high rate of reproduction, early maturity, high genetic selection potential, are disease tolerant and require less space compared to farming with livestock such as cattle, goats and pigs [3, 5]. Texture, appearance and flavour are important sensory qualities that drive consumer choice and preference of meat [6, 7]. According to Kalio [8], consumers ranked taste, availability, affordability and tenderness as the important attributes of rabbit meat. Again, Maigida [9] stated that rabbit meat is healthy and tastes good and that freshness, taste and appearance are the most important characteristics when selecting meat. However, according to Kumar [2] rabbit meat has a typical smell of grass which affects the consumption of rabbit meat by consumers.

Some factors drive consumer behavior in buying a specific kind of meat. Studies on market segmentation revealed that consumers have distinct needs, perceptions, and knowledge toward specific products, especially meat [9]. The most frequently consumed meat types in South Africa are chicken, beef and pork. Meat production statistics indicated that South Africa produced about 3.3 million tons of meat in 2016, 51.4 % for chicken, 36 % for beef, 7. 3% for pork and 5.7 % for mutton [10]. Rabbit meat is mostly consumed in the Stellenbosch area of South Africa [11]. Rabbit meat consumption in the study area has already been established. However, the farming operations are still at an early stage and some consumers rely on rabbit meat distributors outside the study area. There is also limited information on consumer perceptions towards rabbit meat consumption compared to other meats such as beef and poultry. This study aimed at identifying consumers' perceptions towards rabbit meat consumption in the study areas Daveyton and Etwatwa of Gauteng Provinces, South Africa.

METHODOLOGY

The study was conducted in Daveyton and Etwatwa areas of the City of Ekurhuleni Metropolitan Municipality in the Gauteng Province of the Republic of South Africa. The population of Gauteng Province was recorded to be 14.7 million in 2017 [12]. The study adopted the method for determining sample size proposed by Krejcie [13] which had been currently employed by Rahi [14]. The formula is constructed as follows:

$$s = X^2NP(1 - P) \div d^2(N - 1) + X^2P(1 - P) \dots\dots\dots (1)$$

Where s - is the required sample size

X^2 - the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N- represents the population size

P- is the population proportion (assumed to be 0,50 since this would provide the maximum sample size)

d- denoted the degree of accuracy expressed as a proportion (0.05)

$$s = \frac{81621.25}{213.45} = 382.39 \approx 382 \dots\dots\dots (2)$$

For a total population size of 85,000 (households) in the study area, the sample size of 382 was obtained according to the formula. Furthermore, a proportionate sampling technique was used to determine the samples for each of the two study areas. Thus:

The sample size for Daveyton = $(40\,000/85\,000) \times 382 = 180$

The sample size for Etwatwa = $(45\,000/85\,000) \times 382 = 202$

A random sampling technique was used to select the households to constitute the samples for the two respective study areas. Household list was collected from the municipality and represented with piece of paper with numbers on it. Lottery was then used to select the 180 and 202 respondents respectively. This method was chosen because it is easy to apply and allowed each household to have an equal chance of being selected.

Primary data was collected using a semi-structured questionnaire, data was collected from household heads, or a female or male older than 18 years as representative of the household head if the household head was not available. The questionnaire had specific questions informed by the topic of the study which captured information on socio-demographic characteristics, general information about meat consumption, rabbit meat consumption and purchasing decisions towards rabbit meat, and consumer perceptions, attitudes and preferences towards

rabbit meat. A Statistical Package for Social Science (SPSS) version 28 was used to analyse the data.

Specific model

Principal Component Analysis (PCA) method was used to analyse data, involving a 5-point Likert scale ranging from 1= strongly agree (SA), 2=agree (A), 3=neutral (N), 4=disagree (D) and 5=strongly disagree (SD) to determine the consumer perception for rabbit meat. The component scores from the scale were used for Cluster Analysis where the Varimax with Kaisers normalization was used to improve the relationship between the initial variables and the extracted component. The study adopted the principal component method from the study by Kisaka-Lwayo [15] to analyse consumer perceptions towards rabbit meat as follows:

The principal component (PC_n) is computed as:

$$PC_n = f(a_{ni}X_i, \dots a_{1k}X_k) \dots\dots\dots (3)$$

Where PC represents the principal component,
 n is the number of principal components greater than 1,
 a_{1k} is the regression coefficient for the k^{th} variable and is also known as the eigenvector of the covariance matrix between variables, and
 X_k represents the value of the k^{th} variable.

If the number of principal components, n , is greater than 1, then each of the principal components will take the form of a continuous variable or quantity related to the products of the values of the constituent variables and their respective weightings or component loading [14, 16]. Thus, the formula for the principal component obtained by adding the products is expressed as:

$$PC_1 = a_{11}X_1 + a_{12}X_2 + \dots + a_{1k}X_k \dots\dots\dots (4)$$

Where PC_1 represents the first component
 X_1 and X_2 are the first and second independent variables until X_k
 a_{11} and a_{12} are the component loadings of the variables X_1 and X_2
 Eigenvalues are then used to determine the number of principal components.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

The socio-economic characteristics of respondents for the entire sample are presented in Table 1. The respondents who were females were about 53.4% compared to their male counterparts accounted for 46.6% of the sample. The results of this study further revealed that a large proportion of the respondents were single (49.2%), followed by those who are married (37.7%), and widowed/widower respondents (8.9%). Divorced/separated respondents represented the least

proportion of the sample size with just 4.2%. The majority of the respondents were between the age of 31 and 40 years (37.2%). Most of the respondents completed their matric (33.1%) and the minority of the respondents (2.6%) did not have formal education.

The results of the study in Table 1 further revealed that (70.9%) of the respondents were employed by private and government organizations/companies, 13.9% were self-employed, 8.1% were pensioners while (1.3%) were both retired and students. A high proportion (36.9%) of the respondents received a monthly income of between R3001 – R 5000. More than half (51.3%) of the respondents had an average household size of between 4 and 6 while over a third (35,3%) of the respondents had family members of between 1 and 3. About 12.3% of the respondents reported that they had a household size of 7-9 members and only 1% of the respondents had the largest family members of between 10 and 12.

Respondents' perceptions and attitudes towards rabbit meat

Table 2 shows that majority of the respondents (43.6%) were neutral in comparing other meat types to rabbit meat, 18% agreed and 38.4% disagreed that rabbit meat looks better than other meats. More than two thirds (67.4%) agreed that if they were to buy rabbit meat, they would take into consideration the freshness of the meat. Meanwhile, 18.5% were neutral and 14.1% disagreed to the statement: "Freshness, good taste and appearance is the most important characteristics when one is selecting meat preference" [17]. Again, Du Preez [18] stated that the taste of the meat was perceived to be the most important aspect for rabbit meat consumers.

A high proportion of the respondents (61%) shown in Table 1, agreed that they do not know where to buy rabbit meat in their area while 25.1% disagreed. About 56.6% agreed that the meat market/shop where they buy meat does not sell rabbit meat, indicating a gap in rabbit meat accessibility. More than half (58%) of the respondents agreed (strongly agree and agree) that if rabbit meat was available in their local meat market, they would buy it, indicating that there might be a potential market for rabbit meat in the area. Only 19.8% disagreed (disagree and strongly disagree). Appearance with odor, flavor, and texture are sensory attributes that can influence consumer acceptance of meat. Visible characteristics of meat such as color can play a key role in consumers' choice [4].

In Table 2, 31.7% agreed while majority of the respondents disagreed that they buy rabbit meat for cultural/traditional gatherings. More than half (57.4%) of the respondents disagreed that they would buy rabbit meat for religious gatherings. There was a small difference between respondents who agreed (21%) and those who were neutral (21,5%) to the same statement. About 38.1% of the respondents agreed that they would buy rabbit meat for family/social gatherings while less than a

third (32.1%) disagreed. Regarding social considerations of rabbit meat respondents, 70.1% of respondents disagreed (disagree and strongly disagree) with the statement that said rabbit meat is for poor people while only 3.8% agreed (strongly agree and agree). Over two-thirds (73.2%) disagreed that only high-income earners can afford rabbit meat while only 5% agreed. About 38.1% agreed that rabbit meat is food and its purpose is to be eaten while 34.5% disagreed. Although rabbit meat is not widely available in supermarkets within South Africa [18], a high proportion of respondents were neutral (43.1%) when asked if they could choose between rabbit meat and chicken meat for the same price, 28.7% agreed and only 28.2% disagreed. Regarding choosing between rabbit meat and chicken meat, where chicken meat was cheaper, most of the respondents (49.5%) agreed they would buy rabbit meat while 26.6% disagreed. About 57.2% of the respondents agreed (strongly agree and agree) that they would recommend eating rabbit meat to anyone while 41.7% were neutral to the statement and less than 11% disagreed (disagree and strongly disagree). From Table 2, the overall results indicate that majority of the respondents agree or strongly agree with most of the statements. This indicate that there may be a positive perception of consumer willingness to pay for rabbit meat in the area.

The principal component results in consumer perceptions toward rabbit meat

In Table 3, Principal Component Analysis (PCA) was conducted to determine consumer perceptions towards rabbit meat. Four PCAs were extracted with eigen values greater than 1. These PCAs were referred to as PCA1, PCA2, PCA3, and PCA4 representing health consciousness, rabbit meat availability and behavioural considerations; beliefs and social acceptability; social considerations and perception of affordability; and sensory appeal respectively. The principal component (PCA1), which represented the health consciousness, rabbit availability and behavioural considerations accounted for 34.10% of the total variation. The first PCA1 had 11 dominant indicators with all components above 0.3 being positive. This result suggests that consumer perceptions of rabbit meat consumption were largely influenced by how cautious consumers are towards purchasing nutritious food. In addition, consumer perceptions were also influenced by rabbit meat availability and behavioral consideration further suggesting that consumer perception was also influenced by rabbit meat availability and accessibility in the area as well as behavioural considerations when they must make a purchasing decision between rabbit meat and chicken.

Table 3 presents the second principal component (PCA2), referred to as beliefs and social acceptability contributed 15.37% of the total variation. Three factors indicators were found to have eigen values above 0.3 and were positive. These results indicated that consumer perceptions towards rabbit meat was influenced by their

decision to purchase rabbit meat for cultural, religious, social or family gatherings. A study on the consumers' willingness to pay for rabbit meat conducted by Noinoi [1] in the same study area highlighted that consumers are acquainted with the consumption of rabbit meat, thus potential meat producers and distributors need capitalize on consumers' awareness of rabbit meat's health attributes and past consumption of rabbit meat to introduce a viable rabbit meat market.

The third principal component (PCA3) shown in table 3, represented social considerations and perception on affordability, loaded two positive dominant indicators which accounted for 6.52% of the total variation with both factors being positive. These results suggest that consumer perception on rabbit meat is based on the consumers' attitude towards affordability and to which social standard they associate rabbit meat consumption with. The final principal component (PCA4) represented the consumer's sensory appeal toward rabbit meat. Two positive components which accounted for 5.71% of the variation were loaded. The results implied that consumers' perception was influenced by sensory appeal in terms of how the meat looks before purchasing if they would purchase the meat based on its freshness and their attitude towards consumption of rabbit meat products. Sensory appeal in terms of rabbit meat texture, appearance and flavor are important qualities that drive acceptability by consumers [19].

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

Consumers who agreed that they do not know where to buy rabbit meat in the study area amounted to 61%, and 43.6% were neutral in comparing other meat types to rabbit meat in terms of health benefits, freshness, taste, appearance, texture and flavour. More than half (58%) of the consumers in this study agreed (strongly agree and agree) that if rabbit meat was available in their local meat market, they would buy it. This implies that there might be a potential market for rabbit meat in the study area.

Four PCAs were extracted to be significant with eigen values greater than 1 when determining the consumer perceptions towards rabbit meat consumption in this study. The PCAs represented health consciousness, rabbit meat availability and behavioural considerations; beliefs and social acceptability; social considerations and perception on affordability, and sensory appeal respectively. This implied that there is an opportunity to improve the rabbit meat availability in the study area. The study also highlights consumer's behavioural considerations such as beliefs, social acceptability and perception on rabbit meat affordability to be crucial. It is, therefore, recommended that support to the rabbit meat market should be informed by the determinants. The study also recommends studies in awareness and nutritional profiling of rabbit meat since information has not yet reached most of the consumers

due to lack of communication through marketing strategies such as articles, advertisements, magazine and social media.

Ethical aspects

This study took several ethical considerations to ensure it was conducted properly. Permission to collect data from small-scale crop farmers within the vicinity of the Daveyton and Etwatwa of Gauteng Province, South Africa was obtained from the City of Ekurhuleni Metropolitan Municipality. Ethical clearance to conduct the research was obtained from the Ethics Committee of the University of South Africa (UNISA) before data collection. During data collection, consent was requested from the participants to participate in the study and participation was voluntary.

Conflict of interest.

No conflict of interest.

Table 1: Socio-economic characteristics of respondents

Variables	Categories	Frequencies	Percentages
Gender	Male	204	53.4%
	Female	178	46.6%
Marital status	Single	188	49.2%
	Married	144	37.7%
	Divorced/separated	16	4.2%
	Widowed/widower	34	8.9%
Age	18 – 30 years	80	20.9%
	31 – 40 years	142	37.2%
	41 – 50 years	74	19.4%
	51 – 60 years	45	11.8%
	61 – 70 years	23	6%
	Above 71 years	18	4.7%
Education level	No schooling	8	2.1%
	Primary education	10	2.6%
	Secondary education	115	30.1%
	Matriculated	129	33.8%
	Tertiary education	120	31.4%
Employment status	Employed	271	70.9%
	Unemployed	17	4.5%
	Pensioner	31	8.1%
	Student	5	1.3%
	Retired	5	1.3%
	Self-employed	53	13.9%
Monthly income	Less than R1000	6	1.6%
	R1001 – R3000	77	20.2%
	R3001-R5000	141	36.9%
	R5001-R7000	80	20.9
	R7001-R10000	44	11.5%
	More than R10 001	34	8.9%
Household members	1 - 3 Members	135%	35.3%
	4 - 6 Members	196	51.3%
	7 - 9 Members	47	12.3%
	More than 10 Members	4	1%

Source: Survey data (2022)

Table 2: Percentage ratings of respondents' perception and attitude towards rabbit meat

Perception on rabbit meat	SA	A	N	D	SD
I am prepared to pay more for healthy and nutritious food	26%	34.30%	19.10%	12.40%	14.60%
I take into consideration the nutritional benefit of meat when buying it	36.20%	23.50%	21%	4.70%	14.60%
I try to make sure that I buy nutritional and healthy food	51%	19%	13.50%	6.90%	9.60%
Rabbit meat looks better than other meat type	6.40%	11.60%	43.60%	28.50%	9.90%
If I were to buy rabbit meat, I would take into consideration the freshness of the meat	39.80%	27.60%	18.50%	8.30%	5.80%
By only looking at a rabbit, I don't think I will consume any of its products	6.10%	18%	36.50%	26%	13.50%
I do not know where to buy rabbit meat in my area	21.80%	39.20%	13.80%	18.20%	6.90%
The meat market/shop where I buy meat does not sell rabbit meat	31.50%	25.10%	16.60%	20.20%	6.60%
If rabbit meat is available in my local meat market, I would buy	21%	37%	22.10%	9.90%	9.90%
I would buy rabbit meat for cultural/tradition gatherings	8.80%	22.90%	26.20%	20.70%	21.30%
I would buy rabbit meat for religious gatherings	6.60%	14.40%	21.50%	26.20%	31.20%
I would buy rabbit meat for family/social gathering	10.50%	27.60%	29.80%	19.10%	13%
Rabbit meat is for poor people	0.80%	3%	26%	20.70%	49.40%
Only high-income earners can afford rabbit meat	2.80%	2.20%	21.80%	25.10%	48.10%
Rabbit meat is food and its purpose is to be eaten	20.40%	17.70%	27.30%	21.50%	13%
If I had to choose between rabbit meat and chicken meat for the same price, I would choose rabbit meat	10.50%	18.20%	43.10%	20.70%	7.50%
If I had to choose between rabbit meat and chicken meat, were chicken meat was cheaper, I would choose rabbit meat	32.90%	16.60%	24%	20.40%	6.20%
I would recommend eating rabbit meat to anyone	13.80%	33.40%	41.70%	5.20%	5.80%

Source: Survey data (2022)

Table 3: Principal component analysis of consumer perceptions on rabbit meat

Perception on rabbit meat	PCA1	PCA2	PCA3	PCA4
I am prepared to pay more for healthy and nutritious meat	0.816			
I take into consideration the nutritional benefit of meat when buying it	0.804			
I try to make sure that I buy nutritional and healthy food	0.645			
Prior to purchasing rabbit meat, I would take into consideration how the meat freshness				0.598
If I were to buy rabbit meat, I would take into consideration the expected tastiness of the meat	0.648			
By only looking at a rabbit, I don't think I will consume any of its products				0.804
I do not know where to buy rabbit meat in my area	0.772			
The meat market/shop where I buy meat does not sell rabbit meat	0.714			
If rabbit meat is available in my local meat market, I would buy	0.537			
I would buy rabbit meat for cultural/tradition gatherings		0.803		
I would buy rabbit meat for religious gatherings		0.580		
I would buy rabbit meat for family/social gathering		0.822		
Rabbit meat is for poor people			0.747	
Only high-income earners can afford rabbit meat			0.860	
Rabbit meat is food and its purpose is to be eaten	0.446			
If I had to choose between rabbit meat and chicken meat for the same price, I would choose rabbit meat.	0.517			
If I had to choose between rabbit meat and chicken meat, were chicken meat was cheaper, I would choose rabbit meat.	0.722			
I would recommend rabbit meat to anyone	0.585			
Variance explained (%)	34.10	15.37	6.52	5.71
Proportion of variance explained (%)	61.7			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MDS)	0.865			
Bartlett's Test of Sphericity Approx. Chi-Square	2933.404			
	(153)***			

Note: *, **, *** represent significant levels at 10%, 5% and 1%, respectively. Source: Survey data (2022)

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