

Consumer Preference for Goat Meat in Jufra Area, Libya

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Abstract

This study was aimed to measure the consumers' preference of goat meat consumption in Jufra Area of Libya. A questionnaire was performed to obtain the data. Data were collected from 128 respondents randomly sampled from settlements in the four main towns of the area, Hun, Waddan, Sokana and Zela during March to April, 2015. The collected data were statistically analyzed for means and percentages determination. The study indicated that Goat meat is preferable by the Libyan consumer and ranks only the second to mutton with tendency to increase in demand when compared to other meat types. The data showed that the most preferred meat was that obtained from goats that slaughtered at 3 months old followed by 6 months, 9 months and one year and more than one year. The data indicated the most preferred meat by the consumers was that from male goats followed by those eat goat meat irrespective to sex and then by those prefer female meat. The data also indicated that the majority of the consumers eat goat meat every day. The result indicated that the most preferred cut was the leg followed by the forelimb, ribs, loin and finally the neck. The result revealed that the most preferred cooking method was dry cooking (Roasting) followed by moist cooking method (Braising followed by Stewing method). In general, it was concluded that; through extensive health education campaigns, goat meat is well cherished and efforts should be intensified to encourage its consumption.

Keywords

Goat Meat, Consumer Preference, Livestock

1. Introduction

Goat meat has become an increasingly good source of protein for meat eaters in the global marketplace. In general, the global demand for goat meat is growing and it is the main source of animal protein in many North African, Middle Eastern nations, Southeast Asia, the Caribbean, and other tropical regions [1]. Furthermore, goat meat constitutes about 60% of all red meat consumed worldwide [2]. Goat production is one of the most important animal production activities in Libya and it represents the second rank in livestock population after sheep [3]. Furthermore it is population is about 2.6 million heads [4]. There are 3 distinct

breeds of goat in Libya these are; Mahali which is the predominant one, comprises above 90% of the total population and concentrated along the coastal area, Targhi and Tebawi breeds represent the remained percent and mainly found in the southern parts of the country. Local goats are suitable habitat for mountain, arid and semi arid zones characterized with harsh environment and limited feed resources. These areas constitute large parts of the Libyan land. Goat meat is preferable by the Libyan consumer and ranks the second to mutton with tendency to increase in demand [5]. Consumer tastes and preferences will act as the determining factor for the development of the livestock sector in general and small ruminants in particular but lack of data and information on consumer meat preference has

hindered the achievement of this goal. So the aim of this work was to measure the consumers' preference of goat meat consumption in El Jufra area of Libya.

2. Materials and Methods

2.1. Study Area

The present study was conducted at eljufra area-Libya. Eljufra is an arid area located in the northwestern part of Libya, bounded by longitudes 15°00'E to 16°30'E and latitudes 29°00'N to 29°35'N. It covers a surface area of approximately 9,000 km² and appears to be mostly devoid of any vegetation [6]. Agriculture (Date palm production) and livestock farming (especially camel sheep and goat production) are the main stay of the Eljufra economy.

2.2. Data Collection

A survey questionnaire was developed to ask questions to obtain the data. The data include type of meat is preferred; then goat meat eaters were asked about their attitudes about goat meat, frequency of consumption, provide choices between characteristics of type of cut, age and sex of the animal, and type of cooking methods. The study was conducted in four districts of Eljufra area (Hun, Waddan, Sokana and Zela). One hundred and twenty eight copies of a two-paged questionnaire were randomly distributed to 128 respondents, sampled from the four districts; thirty four copies for each.

2.3. Method of Data Analysis

The collected data was coded and entered for processing using the Statistical Package for the Social Sciences (SPSS, 2011) for analyzing and interpreting the results include descriptive analysis such as summary table, bar charts and percentages.

3. Result and Discussion

3.1. Profile of the Choice for Various Meat Types

The profile of the choice of the respondents to various meat types is as shown in (Table 1). The data indicated that 22.2% of the respondents were goat meat eaters compared to 51.6% mutton eater, while camel, white meat and beef meat eater were 10.5%, 10.1% and 5.6% respectively. Relative to other types of meat, Libyans in this sample appear to eat considerably more goat meat than any other type of meat considered except for mutton and it comes only second to it. The analysis of data showed that Libyans have a moderate preference for goat meat in their diet. In this study goat meat preference in Eljufra area ranks second choice to mutton, this finding agreed with Hermas *et al.* [5] who stated that Goat meat is preferable by the Libyan consumer and ranks the second to mutton with tendency to increase in demand.

Table 1. Meat preference according to species.

Type of meat	Percent
Mutton	51.6
Goat	22.2
Camel	10.5
White meat (poultry and fish)	10.1
Beef	5.6

3.2. Reasons for Preferring Goat Meat

The respondent indicated that goat meat is preferred due to three major concepts some of them said that they preferred goat meat because there is a general concept that goat meat has low cholesterol and fat content which make it a healthier option. Moreover, low cholesterol levels also decrease the risk of one developing heart diseases. A statement which is in agreement with USDA [7] who states that goat meat has been documented to be lower in total and saturated fat than beef, pork, lamb and chicken and therefore, may prove to be a healthy alternative to other red meats. Furthermore, goat meat is extremely preferred in different countries because of its meatiness, tenderness, juiciness compared to other red meats [8].

While others said that doctors advise to eat goat meat because of the low content of fat, that is because meat of high fat content may increase susceptibility of high rate of cholesterol in the blood. These findings were consistent with Madruga *et al.*, Malekian *et al.*, Sen *et al.* and Shija *et al.*, who concluded that considering the high nutritional value of goat meat and its greater unsaturated to saturated fatty acid ratio, goat meat has the potential to improve the health of susceptible populations without taking meat products out of their daily diet [9-12].

The third group said that goat feed on desert bushes, which is a natural feed besides some of the farmers feed goats on farm residues including date, a fruit which is the area is famous for it is production, which they thought that it improves the flavor, taste and the color of the meat.

3.3. Frequency of Goat Meat Consumption

The frequency of consumption was indicated in table 2. 28.6% of respondents reporting that they included goat meat in their daily diet followed by those who include goat meat twice a week 28.5%, four times a week 18.7%, once a week 17.1% while only 7.1% of respondents ate goat meat three times a week. The majority of respondents fell into the groups who consumed goat meat every day.

Table 2. Frequency of consumption of goat meat per week.

Frequency	Percentage
Once in a week	17.1
Twice a week	28.5
3 times a week	7.1
4 times a week	18.7
Everyday	28.6

3.4. Preferences of Goat Meat Based on Goat Age

Table 3 indicated that the most preferred goat meat was that obtained from kids slaughtered at 3 months old 64.3% followed by those slaughtered at 6 months, 9 months, one year and more than one years old 21.4%, 7.1%, 4.2% and 3.0% respectively. Most of the respondent justified that they prefer meat from young goats because their meat is tender with moderate fat and have a delicious taste. Meat from young animals was preferred to the meat from the yearlings, which in turn scored higher than the meat from the old animals [13]. Furthermore, it also agreed with Arain *et al.*, [14] who reported that Fat content in young goat meat of age group less than 7 months was considerably low compared to advance age group more than 8 months old. This finding also coincides with that reported In Sudan, meat from young goats (kids) is preferred to meat from older and heavier goats, furthermore, meat from Sudan desert goat kids is tenderer and juicier than that from the older ones [15].

Tenderness is one of the most important factors influencing consumer acceptance of meat and meat generally becomes less tender as animals age. When an animal matures and the size of each muscle fiber increases, a decrease in tenderness will be expected. Young animals have more connective tissue per unit weight in their muscles, but it is fairly soluble. With age, the solubility of collagen decreases when the meat is cooked, and intra- and inter-molecular cross-linking of collagen molecules increase resulting in tougher meat [16]. In contrast it was disagreed with that reported that in Tanzania with Small East African goat strains the majority (59.2%) of the consumers were eating goats with the age between 2 and 3 years. While very few (15.8%) consumers were eating meat from goats with less than one year [17].

Table 3. Consumer preferences of goat meat based on goat age.

Age	Percent
Three months	64.3
Four months	21.4
Nine months	7.1
One year	4.2
More than one year	3.0

3.5. The Preferred Goat Meat Based on Goat Sex

Preference of respondents with respect to sex of goat was shown in table 4. From this study (60.7%) of the respondents preferred meat from male goats, 3.6% preferred meat from female goats while a large number of the respondents (35.7%) were not particular about the sex of animals from which their meats were obtained. It is clear that meat produced from male was highly preferred by the respondents, they said that males are preferred to females because they have more muscle and less fat content. While some of them said that their preference based on religious and customs. Similar observation has been reported in Ethiopia meat produced from males was highly preferred followed by females and

meat from both sexes had got least preference by respondents in almost all livestock species [18]. Also it agreed with Rodrigues *et al.*, [19] who evaluated overall acceptability of goat meat, allowing a taste panel to make hedonic judgments, and showed that males meat were preferred to females. Furthermore, it is in agreement with Harrison *et al.*, [20] who rank the preference of goat meat as intact male, followed castrated male, and finally female. Also agreed with that reported in black Iraqi goat; male carcasses were significantly leaner and less fatter as compared to females [21]. In contrary opposite results that reported in Tanzania with Small East African goat strains most of the goat meat consumers preferred meat from castrated goats followed by female goats, Entire males and lastly within respect to goat sex [17].

Table 4. Consumer preferences of goat meat based on goat sex.

sex	Percent
Male	60.7
Female	3.6
In respect to sex	35.7

3.6. The Preferred Goat Meat Cut

Regarding specific cuts preference as shown in table 5 51.4% of the respondents said that they prefer the leg, 17.4% of them prefer forelimb, 15% of them prefer ribs while 10% of them prefer the loin and 7.1% prefer the neck. It is clear that the most preferred cut was the leg, and their preference was based on the fact that the leg has more muscles and less fat content compared to other cuts. These finding agreed with Simela [22] who reported that cuts from the hind limb of South African indigenous goats are associated with high value due to the low carcass fat and high lean content. Comparable findings have been reported in Tanzania that the most preferred parts of carcass of Small East African goat strains was the hind leg, followed by fore leg and loin due to leanness [17]. It is also agreed with Fisher *et al.*, [23] who found that in Ohio, USA most participants purchased whole carcasses of goat meat due to limited availability but indicated that respondents would like retail cuts: leg (71%), chops (42%), shoulder (24%), and breast (4%). Furthermore,

Table 5. Consumer preferences of goat carcass cut.

Cuts	Percent
Leg	51.4
Loin	10
Forelimb	17.4
Ribs	15
Neck	7.1

3.7. The Preferred Cooking Methods

Meat cooking lead to physical changes in the texture that may affect consumer perception of the meat, cooking methods could also have a significant impact on eating quality and general acceptability of goat meat [24]. Moreover, cooking method could also change the nutritional value, freshness, juiciness, flavour and tenderness of meat resulting

in varied perceptions of goat meat by different sections of the society [25].

Generally there are two methods used for cooking goat: dry heat and moist heat. In dry heat cooking (grilling, rotisserie, broiling, roasting, sautéing, pan-frying), the goat meat is in direct contact with a hot surface or close to the heat source. While with moist heat methods (braising and stewing), the goat meat is cooked in contact with hot liquid, usually at a low temperature. The result revealed that the majority of the consumers prefer dry cooking specially (Roasting) 64.3%, followed by moist heat cooking method, Braising 25% and Stewing method (Mixed with vegetable) 7.1%. These findings agreed with Hoffman and Wiklund [26] who reported that Panelists scored roasted meat and intestines having significantly higher ($P < 0.05$) aroma intensity scores than the plain and mixed with vegetable. This is also comparable to the finding that concluded the proximate composition and fatty acid composition of chevon meat balls were considerably affected by cooking methods [27]. Moreover, considering the fatty acid profile of different samples, microwave cooking is found to be the best cooking methods for healthy eating.

4. Conclusion

This study revealed that meat consumers in Eljufra area have different acceptability on meat from different livestock species. moreover, mutton and goat meat are the most preferred followed by camel, white meat (poultry and fish) while beef had the least acceptance. Considering goat meat the result concluded that age and sex, had clearly effect on acceptability and weaned male kids were the most preferable. Furthermore, goat production is highly concentrated in Eljufra area of Libya and goats play an important economic and socio-economic role, besides some of goat owners relays on goat products to secure their food. The results also revealed that goat meat is preferred only second to mutton in Eljufra area with tendency to increase. In addition to it could be concluded that goat kids meat can be an alternative meat source to other kinds of livestock.

References

- [1] Ekanem, E., Mafuyai-Ekanemb, M. Tagegne, F., Singh, S. and Favors, D. (2013) Journal of Food Distribution Research: 44 (1) p 1-9.
- [2] Malan, S. W. (2000). The improved Boer goat. Small Anim. Res. 36: 165-170.
- [3] Ahtash, A. 2006. Goat production. In: Proceeding of Regional Workshop on Recent Advances in Goat Production Under Arid Condition. H. M. El-Shaer, Talib M. Ali Elam and A. Mehrez (Editors), 310-316. Desert Research Center and FAO, Cairo, Egypt.
- [4] Arab Agricultural Statistics Yearbook - VOL. No. (35) AOAD - Khartoum (2015).
- [5] Hermas, S. A, Ahtash, A. & Majid, A., 2010, growth measures of Libyan goat breeds and their crosses. Eg. J. of Sh. & G. Sci., Vol. 5 (1), P: 93-100.
- [6] Saadi, N. M., Watanabe, K., Imai, A. and Saibi, H. (2008) Integrating potential fields with remote sensing data for geological investigations in the Eljufra area of Libya. Earth Planets Space, 60, 539–547.
- [7] United States Department of Agriculture, Agricultural Research Service. (2013). USDA National Nutrient Database for Standard Reference, Release 26. Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/bhnrc/ndl>.
- [8] Babiker, S. A., Maglad, M. and Koudoda, M. E. (1985). Effects of castration on performance and carcass characteristics of male Sudan desert goats. World Review of Animal Production 21 (1): 11-13.
- [9] Madruga M. S., Resosendo F. S., Narain N., Souza W. H., Cunha M. G. G. and Ramos J. L. F., (2006). Effect of raising conditions of goats on physico-chemical and chemical quality of its meat. Cienc. Technol. Elelement, Vol. 5, p. 100-104.
- [10] Malekian Fatemeh, Khachaturyan Margarita, Gebrelul S. and Henson J. F., (2014). Composition and Fatty Acid Profile of Goat Meat Sausages with Added Rice Bran. International Journal of Food Science, Vol. 2014 (686298), p. 1-8.
- [11] Sen A. R., Santra A. and Karim S. A. (2004) Carcass yield, composition and meat quality attributes of sheep and goat under semiarid conditions. Meat Science, Vol. 66, p. 757-763.
- [12] Shija D. S., Mtenga L. A., Kimambo A. E., Laswai G. H., Mushi D. E., Mgheni D. M., Mwilawa A. J., Shirima E. J. M. and Safari J. G. (2013) Chemical Composition and Meat Quality Attributes of Indigenous Sheep and Goats from Traditional Production System in Tanzania. AsianAust. J. Anim. Sci., Vol. 26, No. 2, p. 295-302.
- [13] Kirton, A. H. (1970) Body and carcass composition and meat quality of the New Zealand feral goat, New Zealand Journal of Agricultural Research, 13: 1, 167-181, DOI: 10.1080/00288233.1970.10421206.
- [14] Arain Mohammad Asif, Khaskheli M, Rajput I. R., Faraz S., Rao S., Umer M. and Devrajani K., 2010: Effect of Slaughtering Age on Chemical Composition of Goat Meat, Pakistan Journal of Nutrition, Vol. 9 (4), p. 404-408.
- [15] Galli, E. S. E., V. S. Ghanem and A. M. S. Mukhtar 1972. A comparative study of some carcass characteristics of the Sudan desert sheep and goats. World Review of Anim. Prod. 14: 351- 357.
- [16] Lawrie, R. A. 1998. Lawrie's Meat Science. 6th edn. Woodhead Publishing Ltd., Cambridge, England.
- [17] Semuguruka, Y. D. (2016). Consumer preference and meat characteristics of four indigenous goat strains raised in traditional livestock production system in selected areas of Tanzania. MSc. Dissertation, Sokoine University of Agriculture, Morogoro, Tanzania.
- [18] Teklebrhan, T. (2013) Consumer perception and preferences of meat types in Harare and Haramaya province, Ethiopia. Journal of Microbiology, Biotechnology and Food Science. 2 (3): 959-969.
- [19] Rodrigues, S. and Teixeira, A.(2009). Effect of sex and carcass weight on sensory quality of goat meat of cabritotransmontano. J AnimSci 87, 711-715.

- [20] Harrison, R., Hill, J., Gillespie, J and McMillin, K. (2013). Proceedings of the 28th Annual Goat Field Day, Langston University.
<http://www2.luresext.edu/GOATS/library/field/mcmillin2013a.pdf>
- [21] Jalal. E. Alkass, Khalil. A. D. Oray, Mahfoodh. K. Abdulla (2014) Studies on Growth, Carcass Traits and Body Composition of Goats Raised either in Intensive or Pasture Conditions, Advances in Life Science and Technology Vol. 19 15-21.
- [22] Simela, L.(2005). Meat characteristics and acceptability of chevon from South African indigenous goats, PhD thesis, University of Pretoria, Pretoria, South Africa.
- [23] Fisher, J. C., Stock, R., Mangione, D. A., & Nye, L. A. (2009). Meat Goat Demographics and Niche Marketing. Tropical and Subtropical Agroecosystems, 11, 47-51.
- [24] Resurreccion, A. V. A. (2003). Sensory aspects of consumer choices for meat and meat products. *Meat Sci.* 66: 11–20.
- [25] Xazela NM, Chimonyo C, Muchenje V, Marume U (2011). Effects of different cooking methods on the consumer acceptability of chevon. *African Journal of Biotechnology* Vol. 10 (59), pp. 12671-12675.
- [26] Hoffman L. C. and Wiklund E. (2006). Game venison-meat for the modern consumer. *Meat Sci.* 74 (1): 197–208.
- [27] Rai, R., Bhattacharyya, D., Praveen, P. K., Ganguly, S., Dalai, N. and Shekhar, S. (2016). Evaluation of various cooking methods on the nutritional and biochemical attributes and consumer appeal of chevon: a review. *International Journal of Science, Environment and Technology*, Vol. 5, No 3, 1520-1529.