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Carcass Yield, Gut Weight and Reproductive Status of Creole Goats Destined to Produce Barbacoa in Guerrero State, Mexico

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Abstract: In Mexico, the meat of goat is usually consumed as "barbacoa" or "birria". However, there is no information on the carcass yield or "barbacoa" yield nor on reproductive characteristics of creole goats slaughtered to produce "barbacoa". For this reason, the objective of this research was to estimate the carcass yield, viscera weight and to evaluate the reproductive status of creole does at slaughter in dry tropic region of north Guerrero, Mexico. The estimation of sample size was performed with a simple random sampling in 2 steps: first, the carcass yield of 30 does was recorded to estimate the variance; and later, the final size of the sampling (n = 109) was determined. Descriptive statistics and "T" and χ^2 tests were used. The slaughter of goats was at an average body weight of 30.6±7.6 kg, with a carcass weight of 17.2±4.3 kg; that means a carcass yield of 56.6±7.7%. There was no difference between carcass yield of bucklings (58.1±6.8%) and pregnant (55.0± 8.6%) or nonpregnant does (56.0±8.1%). The carcass yield used to produce barbacoa was close to one third of the live body weight (11.0±3.5 kg, equivalent to 36.3±7.7%). It was concluded that the average killing weight of creole goats in the region is 30 kg; that the carcass yield at slaughter is 56.6% and to produce barbacoa the yield is 36.3%. In addition, there is higher amount of does to be slaughter than bucklings and from the does, one third are pregnant when the killing is performed.

Key words: Carcass yield, reproductive state, creole goats, barbacoa, gut weight

INTRODUCTION

In Mexico, there is a typical way to cook meat of sheep, that is called "barbacoa". However, there is not enough production of sheep to satisfy the demand of meat to prepare this meal when is needed. On the other hand, the meat of goat is not usually consumed by the mexican people, as is the case of other species such as cattle, poultry and pork (Sanchez, 1984; INEGI, 2007). The main way of consumption is as barbacoa, "birria", or cabrito (kid); however, these food can be categorized as a luxury and are absent in the diet of the great majority of the mexican population; they are just present in holiday food and special ocassions such as weddings or christening parties (Arbiza, 1986; Garcia, 1990; Valladares *et al*., 1993); or they are commercialized in supermarkets and restaurantes of especialities at high price. A difference in the preparation of barbacoa in Guerrero State, compared to other regions of the country, is that here the blood and the gut is used to prepare "pancita" (viscera), a meal very demanded by customers.

However, in spite of the high demand of barbacoa in the state and that its marketing is very fast, being a profitable activity, there is no information on the carcass yield nor on barbacoa yield (Valladares *et al*., 1993). In addition, no research has been conducted in the region evaluating the characteristics of creole goats slaughtered to produce barbacoa. Considering all above mentioned, the objective of this research was to estimate the carcass yield and viscera yield and to evaluate the reproductive status of creole does in the dry tropic northern region of Guerrero State, Mexico, when they are slaughtered to produce barbacoa.

MATERIALS AND METHODS

This research was conducted in Iguala, Guerrero State, Mexico. The city is located at 18° 15′ north latitude and at 99° 38′ west longitude and has the following climate: Aw(w)(i′)g′ (Garcia, 1988). The data were taken from creole goats of dry tropic climate, slaughtered in a special facility destined to supply goat meat as barbacoa to the municipal market of the city.

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The unity of sampling was the slaughtered animal. An irrestrict random sampling was used and the period of record of data was close to three months (February to April, 2007) where the killing rate was from 1-5 goats per day. The live body weight and dead warm body weight were recorded, as well as the weight of skin, roofs, blood, carcass and head. The viscera were weighed before and after whasing them to eliminate their contents. Once the barbacoa was prepared, the weight of carcass (meat and bones), pancita (blood and viscera except uterus) and head were registered.

The estimate of the sampling size to determine the carcass yield was obtained with an irrestrict random sampling (Olguin and Hayashi, 1977), using the following equation:

$$n = [\frac{Z \times S}{e}]^2$$

Where:

- n = Sampling size.
- Z = Value of the standard distribution of 1 -α of confidence in the estimation.
- S^2 = Variance of the first sampling including 30 samples
- e = Precision of the estimation.

Due to the fact that the population variance was unknown, it has to be determined to estimate the approximately sampling size in 2 steps: In the first step, a random samples (n = 30) on which the variance was calculated. This variance was used to determine the n size of the sampling in the second step (Olgun and Hayashi, 1977), that was the following:

- Z = 1.96
- S^2 = 26.83
- e = Precision of 1%.

$$n = [\frac{1.96 \times 5.18}{1.0}]^2 = 103.022$$

The sampling size was 104 goats; however, the total goats recorded were 109 in order to include all animals killed the last day of sampling. The variables under study were: body weight before slaughter, carcass weight (including just kidneys), skin, blood, head and viscera (before and after washing them) as well as carcass weight (meat and bones), head and pancita (viscera) processed as barbacoa. Other data included were the following: origin of goats, sex and reproductive status of does at slaugher. The descriptive statistics was used and "T" and χ^2 tests were performed (Olgun and Hayashi, 1977).

RESULTS AND DISCUSSION

All goats came from the north region of Guerrero State, mainly from Iguala, Cocula, Tepecoacuilco, Huitzuco, Taxco, Teloloapan and Buena Vista municipalities. The 39.4% of goats were bucklings ($p<0.05$) that, compared to does (60.6%) represented a lower amount. From the does, 33.3% were pregnant at the moment of slaughter. This may imply that the demand of goats is too high in the region, so, producers are selling all goats including does no matter they are pregnant, because the selling of bucklings is not enough to satisfy the demand.

To determine the amount of slaughtered pregnant does examining the reproductive tract, a research was conducted in the Ferreria Slaughter House in Mexico City (Olgun and Hayashi, 1977). From 2.502 does killed, 50.8% were pregnant. This value is higher than the 33.3% found in this experiment; however, both studies showed that the amount of pregnant does that are being killed is very high: from one of 2-1 of 3 does. This situation is maybe due to the high demand of goat meat that overcome the national capacity to supply it and because of no importation of goat meat, as is the case of other meat (from chicken, pork and beef cattle). That is the reason why there are similar amounts of pregnant does as well as bucklings. This could lead to the following situations: (Olgun and Hayashi, 1977) reduction of reproductive efficiency (lower calving rate in the herds); lossing of kids and capacity of grassing; possibilities of getting replacements and lower selection of reproductive herd; sistematic culling of fertile goats; lossing lactations and shortening of productive life of females. All this leads to a reduction of herd size and the consequent important economic losses.

The average killing weight (Table 1) was 30.6±7.6 kg, that means a carcass weight of 17.2±4.3 kg; this represents a carcass yield of 56.6±7.7%. There was no difference ($p>0.05$) between the carcass yield of bucklings (58.1±6.8%), non-pregnant does (56.0±8.1%) and pregnant does (55.0±8.6%). Other study (Valencia *et al*., 1986) reported a carcass yield of 59.3% in creole goats of one month of age; 61.5% for creole 2 months old goats and 53.4% for creole goats of more than 6 months of age raised in grasslands. The last value is close to the values found in the present study. The carcass yield is higher in growing goats (2-3 months old) due to the fast rate growth of this phase, that are retaining muscular mass. This fast growing rate is reduced after the weaning, having a steady rate from 6 months of age to the end of growing.

Table 1: Average weight (±standard deviation) and average yield (±standard deviation) of carcass and edible cuts of creole goats slaughtered to produce barbacoa

Variable	Weight (kg)	Yield (%)
Body weight	30.6±4.3	
Weight at slaughter of:		
Carcass	17.2±4.3	56.6±7.7
Head	2.1±0.7	7.4±1.7
Viscera[1]	2.9±0.7	10.7±1.8
Blood	2.0±0.7	6.5±1.4
Viscera content	6.4±1.8	21.2±4.5
Skin	2.2±0.7	7.3±1.3
Barbacoa weight from:		
Carcass	11.0±3.5	36.3±7.7
Meat	8.6±3.2	28.2±7.6
Bones	2.4±0.8	8.4±4.6
Head	1.5±0.6	4.9±1.3
Pancita (viscera)[2]	2.1±0.8	7.5±1.7

(n = 109), [1]Includes víscera used to prepare pancita (intestines, liver, kidneys, rumen, reticular tissue, omasum, abomasum, lungs and heart). [2]Includes viscera above cited, plus blood

The yield of carcass processed as barbacoa was close to one third of body weight (11.0±3.5 kg, equivalent to 36.3±7.7%). No other studies were found relating carcass yield as barbacoa from goats, so, this information is unique. Some other estimation of meat and bone yield of goats at slaughter had been reported (Valencia *et al*., 1986). In Nubia bucklings 10-months old raised in semi-confinement, the average weight of carcass was 13.1 kg (100%); of that weight, 7.49 kg (55.46%) was meat and 5.27 kg (40.28%) were bones. The other amount (de 4.26-14.4%) was considered waste, so, maybe the amount of meat could be higher.

CONCLUSION

It was concluded that the average weight at slaughter of creole goats was 30 kg; that the carcass yield was 56.6%; and that the meat yield processed as barbacoa was 36.3%. In addition, it was concluded that more does are being killed compared to bucklings and from those does, one third are pregnant. The carcass yield is similar in bucklings, non-pregnant does and pregnant does.

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