# CARCASS AND MEAT CHEMICAL AND SENSORIAL CHARACTERISTICS OF GOATS FED SILAGE FROM PIG FAECES

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## Background

Goat products in Mexico come from a great diversity of systems. Meat from goats is marketed in the form of very young animals (8 to 12 months of age), young animals (1 to 2 years old) and old animals (from 2 to 6 years of age), being the second the most common supply (Falcón et al., 1994, Peñúñuri et al., 2000). Usually, castrated or entire males are slaughtered at one year of age with weights from 18 to 28 kg. Carcass yields for goats vary between 44 and 55% (Salinas and Romero, 2000). During dry seasons, forage is scarce to feed these animals. Pig faeces represent a feeding alternative (Iñiguez 1993, Campabadal 1995). Before using these, faeces have to undergo a ensiling process. The resulting silage has been shown to be an excellent alternative, because it not only decreases the odor of the faeces, but it also reduces the viability of some parasites, bacteria and viruses (Martínez et al. 1999; Serrano et al., 2000). However, it is important to determine if the use of silage from porcine faeces (SPF) affects the characteristics of carcass and meat.

## Objective

To evaluate carcass and meat the characteristics from goats fed with SPF under an intensive system.

## Methods

Twelve native male goats from 35 to 39 weeks of age were used in the study (6 control and 6 experimental). They were all slaughtered at the same age, 343 days. Therefore, the younger animals stayed in the trial for 87 days and the older animals for 59 days. Treatment consisted of two isoproteics (14% Crude Protein) and isocalorics (2.7 Mcal Metabolizable Energy/kg Dry Matter) diets fed *ad libitum*: control: ground sorghum 43.14%, corn stover 26%, soy bean meal (17.65%), cane molasses (9.8%), calcium carbonate (1.927%) and calcium orthophosfate 1.43%; and experimental consisting of SPF (20%), ground sorghum (42.86%), corn stover (14%), soy bean meal (12.88%), cane molasses (10.24%). The SPF was elaborated mixing 82% of the solid fraction of pig faeces with 10% of ground sorghum and 8% of cane melasses.

Animals were fasted for 24 h and weighed before slaughtering. Hot carcass weight was measured. Carcasses were kept under refrigeration for 24 h, and then weighed to obtain the cold carcass weight. After that, carcasses were divided into two half carcasses. From the left half carcass, eight pieces (neck, loin, skirt, leg, rib, shoulder, shank and brisket) were obtained, and each cut was reported as a percentage of the half carcass. Kidney fat was removed and weighted. Loins were dissected in order to determine their composition (muscle, bone and internal, subcutaneous and intermuscular fat). Chemical analyses (moisture, protein, intramuscular fat and ashes) were run in the loin muscle. Finally, a sensory analysis was performed using 111 consumer panelists. "Birria" from control and experimental legs was cooked using the same ingredients and by the same person. "Birria" is a typical Mexican meal, and because it is prepared adding numerous ingredients and some of them very spicy, we decided to test roast leg without adding any ingredients. Legs were roasted in a oven to a final temperature of 160ºC. A "difference from the control" test was first run using Birria with 35 consumers panelists. Once results showed that consumers could detect differences, the same test plus a "preference" test was run using Birria with 41 more panelists (in a different day). Panelists were first asked if they found differences, if so there were served another dish with control and experimental samples and were asked for their preference. Finally, a third sensory analysis was run with roasted legs using similar tests with 35 more panelists. Results were evaluated through a t student test at a significant level of $P<0.05$.

## Results

Cut yields were very similar, with the only significant difference ($P<0.05$) being on the shoulder percentage, which was higher for the control group (Table 1). No differences were found for the compositional traits of the loin between the experimental and control groups or for the meat chemical composition (Tables 2 and 3).

Sensory results found on the first evaluation session clearly indicated that consumers could identify a difference between experimental and control samples; 77.14% of the panelist could detect differences. On the second session, the response was similar, 82% of the consumers detected differences, and 88% of them preferred experimental samples over the control samples. Thirty five panelists tested the roast meat, and in this case only 51.42% of them could detect differences, but from those, 83% preferred experimental samples over the control samples.

## Conclusions

It can be observed that feeding goats with 20% SPF did not alter any of the carcass or meat compositional characteristics. However, from the sensory point of view, consumers preferred meat from animals fed SPF.

## Pertinent Literature

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**Acknowledgements**

We thanks UNAM for financing this research throught PAPIIT Proyect number IN210997.

Table 1. Cut yields from control and pig faeces silage fed goats.

| | EXPERIMENTAL | CONTROL | STANDARD ERROR |
|---|---|---|---|
| Neck | 6.93 | 5.78 | 0.62 |
| Loin | 4.8 | 4.5 | 0.24 |
| Skirt | 1.55 | 1.55 | 0.16 |
| Shank | 3.41 | 3.18 | 0.29 |
| Leg | 14.52 | 15.18 | 0.35 |
| Brisket | 4.30 | 3.60 | 0.32 |
| Shoulder | 8.23[a] | 10.67[b] | 0.69 |
| Ribs | 5.12 | 4.88 | 0.33 |
| Kidney fat | 2.47 | 2.02 | 0.62 |

A,b Different superscript within the same row stand for significant differences ($P<0.05$).

Table 2. Compositional traits of loin form control and pig faeces silage fed goats.

| VARIABLES | EXPERIMENTAL | CONTROL | STANDARD ERROR |
|---|---|---|---|
| Yield % | 53.43 | 54.42 | 0.75 |
| Muscle% | 60.38 | 56.11 | 1.72 |
| Bone% | 20.66 | 20.59 | 2.77 |
| Subcutaneous fat% | 0.52 | 0.70 | 0.38 |
| Internal fat% | 1.46 | 2.13 | 0.48 |
| Intermuscular fat% | 6.13 | 2.47 | 1.31 |
| Other tissues% | 8.28 | 10.70 | 1.59 |

Table 3. Loin chemical composition form control and pig faeces silage fed goats.

| VARIABLES | EXPERIMENTAL | CONTROL | STANDARD ERROR |
|---|---|---|---|
| % Moisture | 75.62 | 75.15 | 0.28 |
| % Intramuscular fat | 2.29 | 3.38 | 0.35 |
| % Protein | 15.5 | 20.5 | 2.23 |
| % Ashes | 0.82 | 0.94 | 0.12 |