The type of condensed tannins affected differently growth and meat lipid oxidation of light lambs

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Traditional lamb meat production in Mediterranean countries is based on:

**LIGHT LAMB**

- BW < 25 kg
- Age < 90 d

- During lactation, ewes and lambs are stalled indoors
  - Ewes fed hay or straw + concentrates
  - Lambs fed milk (45-50 days old)

- After weaning, lambs fed high-concentrate diet

To obtain a homogenous product “Light lamb of Aragon”, Protected Geographical Indication (PGI)
INTRODUCTION

The former is the usual intensive system in Mediterranean area

- Grazing good quality forages, as alfalfa, allows a good performance of lactating ewes (Álvarez-Rodriguez et al. 2010)

- Grazing Sainfoin could be an interesting alternative as it is similar to alfalfa except for the content of condensed tannins

**Medicago sativa**
- Multiannual legumes
- High protein content
- Widely used in Mediterranean areas

**Onobrychis viicifolia**
INTRODUCTION

Oxidation is one of the main reasons for quality deterioration in meat. To postpone it, the addition of antioxidants has emerged as a strategy. Quebracho contains natural condensed tannins, which can be used as antioxidants.
The aim of this study was to evaluate:

- The effect of the feeding treatment during **LACTATION** period, (alfalfa, sainfoin, indoor)
- The inclusion of Quebracho in the concentrate during **FATTENING** period

On the **performances** of light lambs and on the **lipid oxidation** of meat
MATERIAL AND METHODS

FRANCE

PORTUGAL

SPAIN

ZARAGOZA
MATERIAL AND METHODS

RASA ARAGONESA SPRING-LAMBING
63 EWES
+
63 MALE LAMBS
MATERIAL AND METHODS

Lactation period

After lambing, ewe-lamb pairs were randomly assigned according to ewe’s BW and BCS to one of three treatments:

- ALFALFA n=21
- SAINFOIN n=21
- INDOOR n=21

Ewes and lambs rotationally grazed paddocks. They were changed to a new paddock fortnightly to ensure that the stubble height was above 10 cm. Ewes and lambs were housed and were fed with a total mixed ration.
MATERIAL AND METHODS

Fattening period: 2 type of concentrate

Weaning

CONTROL
11.9 MJ/kg FM, 17.5% CP

QUEBRACHO
11.7 MJ/kg FM, 17.5% CP

Slaughter 22-24 kg

5%
MATERIAL AND METHODS

Controls and analysis

Body weight

Lambing
0 d

Weaning
42 d

Slaughter
70 d

Lactation

Fattening

ADG

Concentrate intake
MATERIAL AND METHODS

Controls and analysis

- Hot carcass weight
- Kidney fat
- Cold carcass weight
- Dressing percentage

Intramuscular Fat

Lipid oxidation: TBARS

Placed in 6 trays

Darkness at 4 °C

2 5 7 9 12 14 days
RESULTS AND DISCUSSION  Production parameters

Lactation period

✓ ADG: > Sainfoin †
✓ BW at weaning: NS
✓ Concentrate intake: > Indoor

†=P<0.1, NS=P>0.05

Fattening period

✓ ADG: > Quebracho †
✓ BW at slaughter: > Quebracho †
✓ Concentrate intake: > Quebracho *

†=P<0.1, *=P<0.05
## RESULTS AND DISCUSSION

### Carcass characteristics

<table>
<thead>
<tr>
<th></th>
<th>Lactation</th>
<th></th>
<th>Fattening</th>
<th></th>
<th>P-value</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Alfalfa</td>
<td>Sainfoin</td>
<td>Indoor</td>
<td>QUE</td>
<td>Control</td>
</tr>
<tr>
<td>Hot carcass weight, kg</td>
<td>10.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>10.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>11.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>11.1</td>
<td>10.8</td>
</tr>
<tr>
<td>Cold carcass weight, kg</td>
<td>10.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>10.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>10.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>10.9</td>
<td>10.5</td>
</tr>
<tr>
<td>Dressing percentage, %</td>
<td>45.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>45.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>46.4</td>
<td>46.0</td>
</tr>
<tr>
<td>Kidney Fat, g</td>
<td>124&lt;sup&gt;b&lt;/sup&gt;</td>
<td>140&lt;sup&gt;b&lt;/sup&gt;</td>
<td>227&lt;sup&gt;a&lt;/sup&gt;</td>
<td>167</td>
<td>160</td>
</tr>
</tbody>
</table>
RESULTS AND DISCUSSION

Intramuscular fat content

Lactation period

- Indoor
- Alfalfa
- Sainfoin

Fattening period

NO EFFECT

Lipid oxidation

- TBARS (mg MDA/kg muscle)
- Time (d)
- alfalfa
- Sainfoin
- Indoor

- QUE
- Control

Significant differences indicated by different letters.
CONCLUSIONS

- The diet during the lactation period was the most important effect

- Lambs with dams in sainfoin paddocks during lactation is an advisable system:
  - Improved slightly weight gains
  - Extended the meat shelf life

- The inclusion of Quebracho in the concentrate during the fattening period:
  - Tended to increase lamb’s weight
  - Did no have effect on meat shelf life
Thanks for your attention

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