Saltbush (*Atriplex spp.)*: a natural source of vitamin E that can improve the colour stability of lamb meat

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Australian farming systems

Mediterranean climate
  • long, dry summers

Salinity
  • threat to agriculture

Saltbush
  • revegetation
  • green fodder
  • Vitamin E
The importance of meat colour

Freshness and quality $\rightarrow$ decision to purchase

An industry issue

Anti-oxidants improve colour stability

$-$ Vitamin E

Oxymyoglobin $\rightarrow$ Metmyoglobin
## Availability of vitamin E for grazing livestock

<table>
<thead>
<tr>
<th>Vitamin E content (mg/kg DM)</th>
<th>Winter/Spring only</th>
<th>Summer/autumn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green pastures</td>
<td>50 - 200</td>
<td></td>
</tr>
<tr>
<td>Dry pastures</td>
<td>2 - 15</td>
<td></td>
</tr>
<tr>
<td>Grain</td>
<td>5 - 10</td>
<td></td>
</tr>
<tr>
<td>Saltbush</td>
<td>140</td>
<td></td>
</tr>
</tbody>
</table>
Availability of vitamin E for grazing livestock

Saltbush:

- ✔️ source of green feed in summer
- ✔️ high in vitamin E
- ✗ moderate levels of digestible energy
- ✗ high salt (25%)
Experimental design

‘Backgrounding’ phase
  • 64 days
    – Saltbush
    – Control

‘Finishing’ phase
  • 38 days
    – Low vitamin E ration

Slaughter
Hypotheses

Backgrounding lambs on saltbush before finishing would:

1. Increase the concentration of vitamin E in muscle tissue (LL)
2. Improve the colour stability of the LL during retail display
Methodology

- Vitamin E (α-tocopherol) concentration

- Colour stability → oxy:met
  - 5 days aged
  - Simulated retail display
  - 96 hours

0 hours 48 hours 96 hours
### Vitamin E concentration of feed

<table>
<thead>
<tr>
<th>Vitamin E content (mg/kg DM)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><em>Atriplex spp.</em></td>
<td>138 ± 6.4</td>
</tr>
<tr>
<td>Understorey pasture species</td>
<td>2.2 ± 0.4</td>
</tr>
<tr>
<td>Barley grain</td>
<td>1.5 ± 0.2</td>
</tr>
<tr>
<td>Finishing pellet</td>
<td>12.5 ± 1.6</td>
</tr>
</tbody>
</table>
## Muscle vitamin E

<table>
<thead>
<tr>
<th></th>
<th>LL muscle vitamin E concentration (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.8 ± 0.08\textsuperscript{a}</td>
</tr>
<tr>
<td><strong>Saltbush</strong></td>
<td>1.6 ± 0.10\textsuperscript{b}</td>
</tr>
</tbody>
</table>
Colour stability

Retail display time (hours)

Oxy:met

Saltbush
Control
Grazing saltbush can:

- Provide a good source of vitamin E
- Increase the concentration of vitamin E in meat
- Improve the colour stability of meat during retail display
Opportunities for application of results

- Meat colour = very important
- An industry issue
- Utilize existing saltbush to naturally enhance vitamin E levels in meat and improve colour stability