The Use of Organic Pinot Noir Grape Extract as a Natural Anthelmintic in Katahdin Lambs


Abstract

Gastrointestinal nematode parasitism is one of the greatest threats to economic sheep production in the United States. With increased incidences of anthelmintic resistance and the constraints of organic production, there is an increased interest in alternative natural dewormers, such as plants containing condensed tannins (CT). Therefore, the objective of this study, supported by The CERES Trust, was to evaluate the effects of organic fermented Pinot Noir (PN) grape extract on parasite level and performance of Katahdin lambs. A total of 45 Katahdin ewe and ram lambs (23.13 kg ± 0.60) were stratified by fecal egg count, weight, and sex, and were allocated randomly to one of three treatments: 1) an oral dose (10 mL per 4.54 kg of BW) of fermented PN grape extract at 7 day (D7) intervals, 2) the same dose at 14 day (D14) intervals, or 3) control (C; oral dose of water at 14 day intervals). Condensed tannins were extracted, purified, and standardized from the organic PN by the Naumann method and found to have a concentration of 0.20 mg/mL. Lambs were housed on pasture with no additional feed, for the duration of the 63 day study. Fecal egg counts were lower (P = 0.05) and packed cell volumes were greater (P = 0.05) across treatments. Therefore, fermented grape extract can be an effective organic and sustainable strategy for controlling nematodes and increasing performance in lambs.

Materials and Methods

Animals

- 45 organic Katahdin ewe and ram lambs (23.13 kg ± 0.60).

Treatments

- Lambs were stratified by FEC, weight, and sex, and allocated randomly to one of 3 treatments:
  1. Oral dose (10 mL/4.54 kg of body weight) of organic Pinot Noir extract every 7 days (D7).
  2. Oral dose (10 mL/4.54 kg of body weight) of organic Pinot Noir extract every 14 days (D14).
  3. Oral dose of water every 14 days (control).

Lamb Management

- Lambs were grazed on primarily mixed fescue pastures.
  - 63 day grazing period.
  - Ad libitum access to water and trace minerals.
  - No additional feed provided.

- Animals were rotated between pastures based on available forage.

Measurements

- Taken every 7 days from each lamb.
  - Weight.
  - Body condition score.
  - Fecal egg count.
  - FAMACHA© score.
  - Packed cell volume.

Statistical Analyses

- One year summary.
- PROC MIXED of SAS.
- Experimental unit: animal.
- Treatment means were reported as least squares means.
- Contrast:
  - 1) The mean of control versus D7 and D14.
  - 2) The mean of D7 versus D14.

Results

Effects of organic fermented grape extract on parasite level in Katahdin lambs.

<table>
<thead>
<tr>
<th>Item</th>
<th>C</th>
<th>D7</th>
<th>D14</th>
<th>SEM²</th>
<th>Contrast¹</th>
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<tbody>
<tr>
<td>Start FEC®, eggs/g</td>
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<td>39.6</td>
<td>48.7</td>
<td>8.11</td>
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<tr>
<td>End FEC®, eggs/g</td>
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<td>28.1</td>
<td>24.7</td>
<td>9.57</td>
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<td>-18.5</td>
<td>10.13</td>
<td>W</td>
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<tr>
<td>Start FAMACHA©</td>
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<td>1.4</td>
<td>1.8</td>
<td>0.60</td>
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<tr>
<td>End FAMACHA©</td>
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<td>1.5</td>
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<td>5.6</td>
<td>2.2</td>
<td>1.19</td>
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</tbody>
</table>

Discussion

- Fecal egg counts were lower (P < 0.05) and packed cell volumes were greater (P = 0.05) for D7 and D14 lambs compared to the control group.
- Average daily gain and total weight gain were greater (P = 0.02) for D7 and D14 lambs compared to control lambs.
- Body condition scores and FAMACHA© scores did not differ (P ≥ 0.50) across treatments.

Conclusion

- Fermented grape extract can be an effective organic and sustainable strategy for controlling nematodes and increasing performance in lambs.
- Additional research is needed to determine:
  - the most accurate dose of condensed tannins.
  - dosage timing.
  - bioactivity of the tannins that are required to produce the best results.
- An increase in total weight gain and average daily gain could suggest an added benefit of condensed tannins ability to bind to protein causing a by-pass protein effect; this needs further exploration.

Acknowledgements

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