Zinc-methionine bioplex administration to pregnant and lactating sheep and selected wool parameters

Czyż K., Kinal S., Wyrostek A., Roman K., Janczak M., Bodkowski R., Patkowska-Sokoła B.

e-mail: anna.wyrostek@up.wroc.pl
Why methionine and hair?

- Next to cystine one of the main components of keratin, responsible for the proper construction of the hair (Reis.1992; Qi.1994)
Why zinc and hair?

• It contributes in sulfur amino acids incorporation into the hair (Reis.1989)

• Zinc deficiency inhibits wool growth (Reis.1989)
The problem of deterioration quality of wool during pregnancy and lactation

- Lowest thickness than the average (Patkowska- Sokoła 1991)

- Lower growth rate relative to average annual growth (Patkowska- Sokoła 1991)
The aim of the study was to examine the effect of chelate (Zn + methionine)* supplementation to Merino ewes, during pregnancy and early lactation, on wool quality traits

* Zinpro100 preparation (Zincpro Corporation. USA)
Animals

22 pregnant and lactating sheep of Polish Merino

Control group - 11 ewes

Experimental group - 11 ewes

0.4 g Zinpro100/ewe/day

Experiment: 4 months - 3.5 month of pregnancy and 2 weeks of lactation period
# Basic sheep nutrition

<table>
<thead>
<tr>
<th>Diet</th>
<th>Pregnant ewe</th>
<th>Lactating ewe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize silage</td>
<td>34.4%</td>
<td>35.8%</td>
</tr>
<tr>
<td>Meadow hay</td>
<td>27.4%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Rye straw</td>
<td>27.4%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Barley grain</td>
<td>13.8%</td>
<td>17.4%</td>
</tr>
</tbody>
</table>

*Content per kilogram of Dry Matter*
## Zinc (mg/kg d.m.)

<table>
<thead>
<tr>
<th>Group</th>
<th>pregnant ewe</th>
<th>lactating ewe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>49.36</td>
<td>62.12</td>
</tr>
<tr>
<td>Experimental</td>
<td>89.36</td>
<td>102.12</td>
</tr>
</tbody>
</table>

Minimum requirement: 20-33 mg/kg DM
Maximum requirement: 750 mg/kg DM
(NRC 1985)
Samples and measurements

- Wool samples were cut at the left side before and after experiment from every ewe to evaluate:
  - **Wool length** (cm)
  - **Wool thickness** (µm)
  - **Zinc content of wool** (mg/kg DM) - atomic absorption spectrophotometer AAS-3
  - **The composition of element ions on the surface of wool** – scanning microscope
  - **Histological structure of wool** – scanning microscope
Results
# The average length and thickness of wool

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group</th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length</strong> (cm/ 4 months)</td>
<td>mean</td>
<td>2.58*</td>
<td>3.31*</td>
</tr>
<tr>
<td></td>
<td>sd</td>
<td>0.5</td>
<td>0.88</td>
</tr>
<tr>
<td><strong>Thickness</strong> (µm)</td>
<td>mean</td>
<td>22.56*</td>
<td>24.39*</td>
</tr>
<tr>
<td></td>
<td>sd</td>
<td>0.35</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*P≤0.05
The average zinc content in the dry matter of the entire wool fibres

<table>
<thead>
<tr>
<th>Group</th>
<th>Zn (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>85.56*</td>
</tr>
<tr>
<td></td>
<td>sd 9.13</td>
</tr>
<tr>
<td>Experimental</td>
<td>98.39*</td>
</tr>
<tr>
<td></td>
<td>sd 11.52</td>
</tr>
</tbody>
</table>

*P≤0.01

The zinc content of the wool of normal sheep range from 77 to 120 mg/kg
The content of some element ions on the wool surface

- Control group
- Experimental group

Elements: S, Na, Ca, Mg, Al, Si, P, Zn
Histological structure of wool

Control group

Experimental group
Conclusions

In experimental group:

• Wool length was ca. 30% higher
• Thickness was ca. 8% higher
• Zinc content in DM was about 15% higher
Zinc-methionine bioplex administration is recommended during pregnancy and lactation in order to reduce depression in wool growth.
Thank You for Your attention!