Measurement of palatability of 14 common ingredients used in feed mixes for lambs and ewes

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Introduction: Definition of Palatability

- **PALATABILITY**: interrelationship between flavor and post-ingestive effects, influenced by:
  - feeds’ chemical characteristics
  - animals’ nutritional state
  - animals’ past feeding experiences

- Most research carried out on forages
- No much literature available on concentrates
Feed neophobia often observed with concentrates: e.g. in dairy sheep the change of concentrate or the insertion of a new raw material in feed mixes often causes feed refusals:

- Concentrates are supplied alone only during the two daily milkings
- Short time available to eat the concentrates during milking

Economical damages for farmers (milk losses, tendency of using the same concentrate) and feed companies (customers’ complains, limited use of certain ingredients)

**Objective**

Evaluation of the short term palatability of 14 concentrate ingredients on naive and experienced sheep
Materials and methods: animals

- **14 female Sarda lambs**
  - Age: 72±9 d (32±8 d after weaning) **BW**: 16.9±1.3 kg
- **14 multiparous dry Sarda ewes**
  - Age: 4±1 years **BW**: 50.6±3.1 kg **BCS**: 3.1 ± 0.2

PREVIOUS FEEDING EXPERIENCE

**Lambs**: from weaning to experiment (32 days): alfalfa hay + pelleted feed (barley, corn grains, and wheat grains; soybean meal, beet pulps, alfalfa dehydrated meal, wheat brans, molasses (DM 87.5%, CF 9.4%, CP 18.9%))

**Ewes**: Pasture + various types of concentrates or concentrate mixes during milking time

Material and Methods: palatability tests

- **Basal diet**: ryegrass hay and barley meal+urea

- **Training period** (9 d): 6 min palatability tests with barley meal

- **Experimental period** (14 d): 6 min palatability tests on 14 feeds
  - ground with 1 mm screen
  - same feed in 2 bowls

<table>
<thead>
<tr>
<th>Material</th>
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<tbody>
<tr>
<td>Alfalfa, dehyd.</td>
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<tr>
<td>Beet pulps</td>
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<td>Corn gluten meal</td>
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<td>Corn grains</td>
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<td>Corn middlings</td>
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<td>Oat grains</td>
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<td>Pea grains</td>
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<td>Canola meal</td>
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<td>Soybean hulls</td>
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<td>Soybean meal 44</td>
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<td>Soybean meal 49</td>
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<td>Sunflower meal</td>
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<td>Wheat brans</td>
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<td>Wheat grains</td>
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**Material and Methods**

**Experimental feed**

Experimental design: two 14 x 14 Latin squares

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Statistical analysis

GLM for Latin square design and non parametric tests
**Results:** Training period

**Lambs**
Barley DMI during training

**Ewes**
Barley DMI during training

**Results:** % of animal which didn’t eat at all

Animals that did not eat: **Lambs** = 26%, **Ewes** = 18%; *P < 0.09*
**Results:** DMI in 6 min by Lambs

![Graph showing DMI in 6 min by Lambs with various diets and P < 0.05](image)

**Discussion:** lambs

**Intake** of the experimental feeds varied from high to low values in a **continuum**, without clear cuts

- lack of experience?
- sensorial properties?

The lambs **refused** a familiar feed (**dehydrated alfalfa**)  
- off-flavours?
**Results:** DMI in 6 min by Ewes

![Graph showing DMI in 6 min by Ewes](image)

Discussion: **Ewes**

The ewes showed a **marked preference for 4 feeds** often supplied as **single feed during milking**

- beet pulps, wheat grains, pea, and corn grains

**Low intake** or almost total rejection for the **other feeds**, including several feeds commonly used for sheep feeding but rarely used as single ingredients

- **less prone than lambs to experience novel flavors. I eat what I know..**
**Results:** DMI level of intake in 6 min

- $a, b = P < 0.05$

![Bar chart showing DMI level of intake in 6 min for different ingredients, with annotations indicating statistical significance.](chart.png)

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**Conclusions**

- **What are the causes of the large differences in palatability?** Aroma? Taste? Texture? Experience?
  - We have measured volatile compounds to identify possible important molecules

- **Can we improve the intake of the low palatable concentrates?**
  - Mixes with palatable ingredients?
  - Proper training of the animals?
  - Fetal programming?
  - Feed enhancers? See our talk tomorrow (S.47) on "Flavours affect feed reward in lambs and ewes fed canola meal"