Comparison of two laboratory-scale ensiling methods to assess effect of reducing sugars

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Objective:
To compare the suitability of two micro-silo methods to assess the effects of reducing sugars (erythritol and lignosulfonates) on pH and NH₃ content of grass silage. The goal is to naturally or artificially recreate the heating phase arising from respiration.

Methods
Vegetal material: Italian ryegrass, first cut, pre-wilted 2 days
Experimental factors:
- N fertilization rate: 0 vs. 180 kg N ha⁻¹
- Silage additive: no additive
  - erythritol (6% of dry matter)
  - lignosulfonates (2% of dry matter)
- Ensiling methods:
  - Barrels (self-heating)
  - Packs (artificially heated)

Results (n=36)
All 3 factors have a significant impact on pH and/or NH₃ content (% of total N).
- Barrels showed a lower pH (P<0.001) and higher NH₃ content (P<0.05) than packs;
- Fertilization increased NH₃ content (P<0.001);
- Silages with reducing sugars showed a higher pH than the control silage (P<0.01);
- Lignosulfonates treatment is the only one leading to a drop in NH₃ content (P<0.05);
- We found no interaction between additives and fertilization or ensiling method.

Conclusions
The absence of interaction between ensiling methods and the other factors suggests that trends resulting from additives could be comparable between ensiling methods, although both pH and NH₃ absolute values are different.