Grass management (methane emissions)

Last update: 2 June 2023

- **Type of challenge**: Environment.
- **Challenge**: Climate change (enteric methane emissions).
- **Action**: Reduction of enteric methane emission.
- **Animal category**: All ruminants.
- **Technique**: Improve quality and digestibility of grass via decreasing grass maturity through better grazing management and early cutting of grass for conservation as silage or hay.
- **Mode of action**: Decreasing grass maturity results in greater digestible energy and protein content.
- **Potential efficacy:** 13% abatement of enteric CH4 emissions per kg milk on average.
- **Nature of evidence of efficacy**: Peer-reviewed scientific publications (meta-analysis).
- **Factors impacting on efficacy**: Plant species; variety; maturity at harvest and preservation can affect forage quality and digestibility.
- **Mode of use:** Grazing or conservation as hay or silage.
- **Requirements/limitations**: Applicable in all grass-based production systems; requires good knowledge of local agronomic conditions and careful management by farmers.
- **Economic consequences**: Reduction of grass yield compensated partially by higher forage efficiency and increased milk yield.
- **Other considerations**: The higher protein content in grass may increase nitrogen excretion; this can be mitigated by combining with low protein concentrate to optimize overall nitrogen content in the diet; possible synergies with legume grass and tanniferous forages.
- **References**:

  - Arndt *et al*. (2022). *Full adoption of the most effective strategies to mitigate methane emissions by ruminants can help meet the 1.5 °C target by 2030 but not 2050*. PNAS May 10, 2022. https://doi.org/10.1073/pnas.2111294119
  - Van Middelaar *et al*. (2014). *Cost-effectiveness of feeding strategies to reduce greenhouse gas emissions from dairy farming*. J. Dairy Sci. 97 :2427–2439. http://dx.doi.org/10.3168/jds.2013-7648
  - Brask *et al.* (2013). *Enteric methane production, digestibility and rumen fermentation in dairy cows fed different forages with and without rapeseed fat supplementation*. Anim. Feed Sci. Technol. 184, 67-79 (2013). https://doi.org/10.1016/j.anifeedsci.2013.06.006
  - FAO (2023). FAO LEAP guidelines on Methane emissions in livestock and rice systems: Sources, quantification, mitigation and metrics.
  - EIP-AGRI Focus Group (2017). Reducing emissions from cattle farming.

- **Other techniques**: Unsaturated fat sources (linseed, rapeseed fat); electron sink (nitrate); methane inhibitors (Asparagopsis taxiformis, 3-NOP, tanniferous forages); shift in rumen fermentation pattern (tannins, probiotics, organic acids, essential oils, decreasing forage-to-concentrate ratio); lower emission intensity (increasing feeding level, increasing feed efficiency, decreasing grass maturity).

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