Research Paper Summary

Meta-analysis considering 98 mitigation strategies

Short title: Mitigation Strategies

Key words: Methane, mitigation

Headline

It is worth noting that 2/3rd of the strategies did not significantly decrease methane emissions, farmers need to make sure that there is good evidence that any particular product does reduce methane emissions with the type of diet they are feeding to their cattle.

Globally only 100% adoption of the two most effective strategies can meet the 1.5° C target by 2030.

Background

Whilst individual farmers are interested in reducing methane emissions on their own farm, the adoption of strategies across the world are what will make the difference to climate change.

Work undertaken

In this paper the authors conducted a meta-analysis that looked at 98 mitigation strategies reported in 430 peer-reviewed. People who want to promote a particular mitigation strategy will sometimes find a paper which reports a positive effect and ignore other papers which cast doubt on the effectiveness of the strategy. A meta-analysis includes all published research to give a complete picture of the efficacy of a particular strategy.

Highlights of this very comprehensive paper are listed below.

- Of the 98 strategies 63 did not significantly decrease methane emissions
- The most effective strategies are given below but remember that within these overall strategies not all individual products will be effective. Also, there are other effects to be considered e.g. profitability of the overall system.
  - Increasing feeding level
  - Decreasing grass maturity
  - Decreasing forage-to-concentrate ratio
  - Methane inhibitors
  - Forages containing tannin
  - Electron sinks
  - Oils and fats
  - Oilseed

Results

Globally only 100% adoption of the two most effective strategies can meet the 1.5° C target by 2030 but not by 2050 because mitigation effects are offset by projected increases in production as result of increases in demand for milk and meat.

Figures below from the paper explain the efficacy of the mitigation strategies.

Figure 2 shows the effects of mitigation strategies on animal performance, strategies which increase feeding level and feed quality lead to increased milk production and most strategies either have a positive or no effect. For growing cattle some strategies e.g., feeding oilseeds had a negative effect on animal dairy live weight gain but not on milk production.

Figure 3 in the paper gives a graphic illustration of the differences between projected change in emissions in Europe compared with Africa. The possible strategies have a better chance of meeting reduction targets in Europe than in Africa, this is due much greater expected increases demand for animal based human foods in Africa as a result of population growth.

Whilst it may seem discouraging that full adoption of the strategies is needed the authors do point out that some strategies were not included because of insufficient publications e.g., breeding low methane emitting animals and improving animal health. We know that

these are possible strategies and there will be other as the science develops over the coming years with increasing research on the topic.

Reference

Arndt, Claudia, et al. "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." Proceedings of the National Academy of Sciences 119.20 (2022): e2111294119