

Supplementary evidence from Phil Bicknell (MET0049)

The UK Agri-Tech Centre is driving innovation and accelerating adoption, which in the context of ruminants and methane mitigation, is focused on genetics, nutrition, animal health and management. Technologies covering all these areas can be exploited to mitigate methane emissions.

1. Information / research on ruminant vaccination **Reference: Net Zero & Livestock – Bridging the Gap Report, July 2023**

1.1 Vaccination against endemic disease

Targeting endemic cattle disease has significant potential to reduce greenhouse gas (GHG) emissions. Endemic diseases result in milk or meat losses, reduced product quality, or failure to meet key performance indicators e.g., growth rate, fertility, feed efficiency, and mortality. This means a greater number of animals, quantity of time, or combination of the two, are required to maintain milk and meat output. This increases resource use, GHG emissions and economic costs of production at the product, operation and sector levels. Shifting the emphasis to a preventative disease control focus encompasses changes in management practices, biosecurity, surveillance, and prevention. Vaccines have a critical role to play in this strategy with details outlined in the 'Net Zero & Livestock: Bridging the Gap' Report.

1.2 Methane vaccines

Vaccines to reduce methane emissions are under development but remain several years away from commercial release. Recent research in New Zealand has used vaccines that generate specific antibodies, but the impact of this on methane emissions remains to be quantified. These researchers have an aspirational goal to reduce methane by 30% with the vaccine targeting a range of methanogens. Using a 30% reduction of enteric methane emissions as a best-case scenario, a ruminant methane vaccine applied in the UK would have the potential to reduce annual methane emissions by 6.8 MtCO₂-eq based on figures from 2020. Given the contribution of ruminant methane to UK livestock emissions, this would be a significant contribution to the 64% reduction goal for UK agriculture by 2050.

While there is medium-high confidence a commercial product can be available by 2050, there is low confidence this is possible by 2030. There could also be delays in implementation for a product developed overseas in order to register it for the UK market. So, it is highly unlikely a vaccine will be available to the UK livestock sector that could deliver a 30% reduction in methane emissions by 2030 in line with the 'Global Methane Pledge'. Such timelines should inform policy and regulatory requirements to minimise delays and fast-track commercial products into industry.

2. Further information on plasma technology

Improving manure management using innovative processing methods such as plasma treatment of slurry can bring about significant emissions reduction, e.g. ammonia and methane emissions from pig slurry storage can largely be eliminated, but there is a need for innovation to provide green energy to drive on farm plasma units to minimise the carbon footprint. A plasma technology application developed by N2 Applied (Norway) treats livestock slurry to produce an enriched fertiliser. Ammonia and methane emissions from pig slurry storage are claimed to be reduced by 95% and 99% respectively with this treatment.