

Methane Production in Scottish Beef Cattle and Sheep Systems

What does methane emissions have to do with livestock production?

The Challenge

All UK countries have ambitious targets to reduce greenhouse gases (GHG) in agriculture. Methane is a major contributor to these emissions and livestock are estimated to contribute over 50% of total agricultural GHG in the form of methane (CH₄).

More robust figures are needed, however, to account for local production systems. It also raises the question, how can we reduce emissions from agriculture?

The Research

The flocks and herds at the SRUC Beef and Sheep Research Centre were used to measure emissions.

Trials involved over 200 finishing cattle, 96 breeding cows and 96 sheep all of contrasting breeds in housed and grazing situations.

Methane output can be recorded in the six 'GreenCow' chambers (see picture) or, while at pasture, the sulphur hexafluoride (SF₆) marker gas system.

Alongside the core measurements of CH₄ and dry matter intake (DMI); animal growth, feed efficiency and behavioural data were recorded from sensors. Rumen fluid samples were also taken.



The state of the art 'GreenCow' facility at SRUC.

The 'GreenCow' measurement chambers are used to measure methane emissions in housed livestock. This highly accurate facility has also been used to test and validate conceptual handheld recording devices.

The Results

Feed efficiency is directly linked to CH₄ output but is not the only factor to influence the emissions level.

For forage-based diets, forage type has little effect.

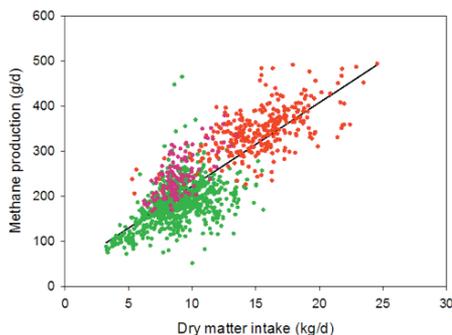
The amount of CH₄ produced per unit of feed DMI is consistent across all types of livestock, see chart overleaf.

In a large multi-centre UK project, breed type was also shown to have little or no effect, but within breed, genetic effects were shown.

There is considerable variation linked to activity patterns, rumen microflora, digestive processes (passage rate etc) and physiological state (lactating or dry).

This shows there is scope for reductions.

Chart: Relationship between cattle feed intake and methane production



The above chart illustrates a strong relationship between DMI and methane production. Growing and mature cattle are depicted in green, lactating cattle in red, dry dairy cattle by purple dots.

The Impact

Detailed inventories will help build a more accurate reflection of the environmental impact (in carbon terms) of actual production practices. In turn, this will help inform management decisions towards reducing emissions and supporting productivity.

Carbon emissions are effectively outputs that have not been converted into desired/saleable output. Many mitigation measures to reduce emissions can, therefore, also improve efficiency – reducing costs or improving output – supporting both environmental and business sustainability.

Further Information

For more information on carbon footprinting contact SAC Consulting Rural Business Unit at rbuedinburgh@sac.co.uk or regarding beef production systems contact SAC Consulting beef and sheep at beefandsheep@sac.co.uk

Project Detail

Project finish date: March 2016.

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Research led by Future Farming Systems group but involved researchers in Animal and Veterinary Science and collaborators at six other UK centres.**

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**For further info
<http://www.ghgplatform.org.uk/>**

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