

# Red Meat Development Programme

## Ruminant nutrition regimes to reduce methane and nitrogen emissions



The Red Meat Development Programme is managed by Hybu Cig Cymru on behalf of Farming Connect. Within the programme the Institute for Biological, Environmental and Rural Science (IBERS), Aberystwyth University is one of three Farming Connect Red Meat Development Programme Development Farms whose role is to demonstrate new approaches and new technologies to support sustainable beef and sheep production systems.

Greenhouse gases allow the sun's heat radiating from the earth's surface to be reflected back into the atmosphere. Without these gases the earth would be too cold to sustain life as we know it. However since the start of the industrial era the concentrations of greenhouse gases (in particular CO<sub>2</sub>) have increased dramatically and there is now real evidence of global warming occurring.

Nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) are potent greenhouse gases. In Wales 87% of all N<sub>2</sub>O and 70% of all CH<sub>4</sub> emissions are as a result of agriculture reflecting the rural nature of life in Wales. However when all greenhouse gas emissions are considered (especially CO<sub>2</sub>) this falls to approximately 7.5% for CH<sub>4</sub> and 4.8% for N<sub>2</sub>O total Welsh based emissions.

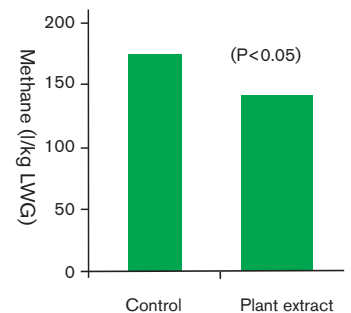
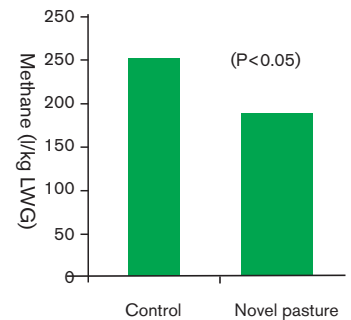
Most of the methane produced comes from sheep and cattle (about 50:50) in Wales resulting from fermentation of food in the rumen. Importantly reducing methane and nitrous oxide emissions presents an opportunity for farmers to make a contribution towards decreasing greenhouse gas emissions whilst also boosting farm profitability.

### Our research is focussed on understanding:

- How ruminant nutrition and husbandry can be used to decrease methane and nitrogen emissions per animal and per unit output
- How recent advances in grass and legume breeding can be used to decrease methane and nitrogen emissions per animal and per unit output
- How novel dietary supplements can be used to decrease methane emissions and nitrogen excretion per animal and per unit output in both intensive and extensive farming systems.

### Results to date:

- Feeding novel forages high in water soluble carbohydrates has been shown to significantly decrease methane emissions by lambs when expressed per unit of liveweight gain.
- Novel plant extracts based on garlic have also been shown to significantly decrease methane emissions by sheep



### Conclusions

Ongoing research is aimed at identifying practical ways that these emissions could be decreased. Approaches that decrease the emissions of greenhouse gases from animal agriculture might also be expected to boost animal productivity producing a "win-win" situation.



# Rhaglen Datblygu Cig Coch Cyfundrefn borthiant i gilgnowyr i leihau gollyngiadau methan a nitrogen



Rheolir y Rhaglen Datblygu Cig Coch gan Hybu Cig Cymru ar ran Cyswllt Ffermio. O fewn y rhaglen Sefydliad y Gwyddorau Biolegol, Amgylcheddol a Gwledig (IBERS), Prifysgol Aberystwyth yw un o dair Fferm Ddatblygu Rhaglen Datblygu Cig Coch Cyswllt Ffermio sy'n arddangos ymagweddau newydd a thechnolegau newydd i gynnal systemau cynaliadwy i gynhyrchu cig eidion a defaid.

Mae nwyon tŷ gwydr yn caniatáu gwres yr haul sy'n rheiddiadu o wyneb y ddaear i gael ei daflu'n ôl i'r atmosffer. Heb y nwyon hyn byddai'r ddaear yn rhy oer i gynnal bywyd fel yr adwaenwn ni e. Fodd bynnag, ers dechrau'r oes ddiwydiannol mae'r crynhoad o nwyon tŷ gwydr (yn arbennig CO<sub>2</sub>) wedi cynyddu'n ddramatig ac erbyn hyn mae tystiolaeth gwirioneddol o gynhesu byd eang yn digwydd.

Mae ocsid nitraidd (N<sub>2</sub>O) a methan (CH<sub>4</sub>) yn nwyon tŷ gwydr cryfion. Yng Nghymru mae 87% o'r holl N<sub>2</sub>O, a 70% o'r holl olyngiadau CH<sub>4</sub>, yn digwydd o ganlyniad i amaethyddiaeth, gan adlewyrchu natur wledig bywyd yng Nghymru. Serch hynny pan ystyrir pob un gollyngiad o nwyon tŷ gwydr (yn arbennig CO<sub>2</sub>) mae hwn yn syrthio'n fras i 7.5% o CH<sub>4</sub>, a 4.8% o N<sub>2</sub>O o'r cyfan o'r gollyngiadau sy'n dod o Gymru.

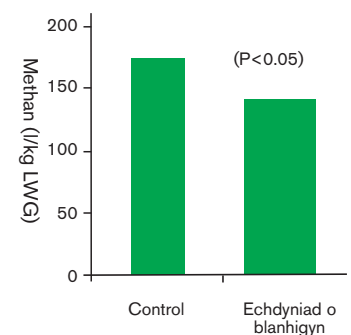
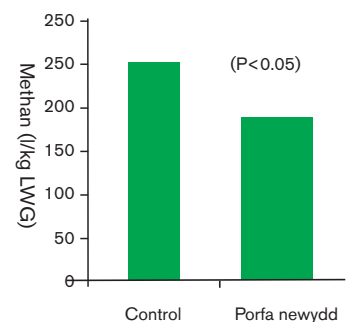
Daw'r rhan fwyaf o'r methan a gynhyrchir oddi wrth ddefaid a gwartheg (tua 50:50) yng Nghymru o ganlyniad i eplesiad bwyd yn y rwmen. Byddai lleihau gollyngiadau methan ac ocsid nitraidd yn sylweddol yn rhoi cyfle i ffermwyr gyfrannu tuag at leihau'r gollyngiadau o nwyon tŷ gwydr, tra hefyd yn manteisio i wneud elw i'r fferm.

## Canolbwyntia ein hymchwil ar ddeall:

- Sut y gellir defnyddio ymbortheg i gilgnowyr a hwsmonaeth i leihau gollyngiad methan a nitrogen fesul anifail ac fesul uned o'r hyn gynhyrchant.
- Sut y gellir defnyddio datblygiadau diweddar mewn bridio glaswellt a meillion i ostwng gollyngiadau methan a nitrogen fesul anifail ac fesul uned o gynnyrch.
- Sut y gellir defnyddio ychwanegiadau newydd at ddeiet i ostwng gollyngiadau methan ac ysgarthion nitrogen fesul anifail ac fesul uned o gynnyrch mewn systemau ffermio dwys yn ogystal a systemau ffermio eang.

## Y canlyniadau diweddaraf

- Danghoswyd fod bwydo porthiant sy'n uchel mewn carbohydradau hydawdd mewn dŵr yn gostwng gollyngiadau methan mewn ŵyn yn sylweddol pan y'i ystyrir fesul uned o gynnydd mewn pwysau byw.
- Danghoswyd bod echdyniadau newydd o blanhigion a seiliwyd ar garleg wedi lleihau gollyngiadau methan mewn defaid.



## Canlyniadau

Anelir yr ymchwil cyfredol at adnabod ffyrdd ymarferol o leihau'r gollyngiadau hyn. Gellid disgwyl bod cynigion sy'n lleihau gollyngiadau nwy tŷ gwydr yng nghyswllt amaethu anifeiliaid yn mynd i fod yn ysgogiad i gynhyrchiant anifeiliaid ac yn esgor ar sefyllfa fyddai'n fantais ddeuol.