

FP7 SMethane		
Project Title: Technological platform to develop nutritional additives to reduce methane emissions from ruminants		
Deliverable n°: D 6.1	Production of an online calculator	

DELIVERABLE 6.1

From the outset of the project it was established that a publically available resource on the website would be an online calculator to examine the effects of additive inclusion on methane reduction and effects on performance. In order to respect the confidentiality of the SME partners it was decided that names of additives would not be included so a list of presumed assumptions was detailed for use of the three calculators. The calculator format is a simple ‘enter value’ approach in an excel environment and the responses to different scenarios are displayed. A set of three calculators have been produced to cover dairy cattle, beef and an economic calculator (‘what if’). Since Tier 1 equations only use the number of animals and a set emission factor, irrespective of performance, it was decided to formulate calculators using mainly a Tier 1 approach but using Tier 2 type equations as the basis for the multiplier. However, it must be stated that the approach used was generic and not country specific and is based on current scientific evidence and some assumptions. The information requested for the user to complete is readily available to farmers as it would form the basis of their purchasing and feeding strategies.

General assumptions for all models

Based on the results of our *in vitro* and *in vivo* experiments we categorized the response of additives into four types of response. 1) no response; the baseline methane emissions based on the supplied data with no additive inclusion: 2) low response; a 10% reduction in methane production: 3) average response; a 15% reduction in methane emissions: and 4) best response; a 25% reduction in methane production. To make the model simple and easy to use, the other assumption made is that methane production is only linked to dry matter intake (DMI) and as a consequence a single value of 30 litres per kg DMI was used across the models.

Beef model:

Assumptions

In order to calculate DMI of beef cattle a formula was used that is based upon the average daily gain (ADG) of the beef cattle. A simple regression approach was taken using the following three variables, purchase weight, sale weight and length of time on farm, resulting in a single ADG value. Since ADG is highly correlated with intake an average DMI was calculated using the following formula $DMI = ((ADG-4.55)+11.657)*ADG$. It was also assumed that carbon credits were valued at 10 euro per tonne.

Reported data

Using the beef calculator it is possible to obtain some information on the production enterprise relative to greenhouse gas emissions but it must be noted that the approach used is relative to not feeding any additive and only looks at the gross effects on the animal and it is not a life cycle assessment.

Dairy cattle

Assumptions

In a similar fashion to the beef calculator a DMI needs to be assumed for the dairy cows. Most farmers have a target DMI to aim for but this is typically based on a high and a med/low production group. Most producers will again not know much dry matter each animal ingests. The approach used here to estimate DMI is based on milk yield instead of growth rate. The formula used to calculate intake was as follows $DMI = (\text{mean daily milk yield} - 13)*2$. Again a standard value of 30 litres of methane per kilogram DMI was used. It was also assumed that carbon credits were valued at 10 euro per tonne.

Reported data

As with the beef calculator it is possible to obtain some information on the production enterprise relative to greenhouse gas emissions but it must be noted that the approach used is relative to not feeding any additive and only looks at the gross effects on the animal and it is not a life cycle assessment.

What if

In general the 'what if' calculator focusses on the dairy production as this is the largest target for SME to sell additives into as there is a larger opportunity for economic returns short, medium and long term whereas beef production the return is only seen at the end of an animals life. The calculator allows the user to enter data based on milk price, price of carbon credits, increase in milk yield, enhancement in price (green credentials paid by processor) and acceptance to consumer (green credentials paid by consumer).

Assumptions

The what if calculator uses the same assumptions as the dairy calculator as it is based upon the dairy scenario. The addition to this calculator is that it allows the user to enter more variables and it has a costing factor based on the efficacy of the additive.

Reported data

In terms of the usefulness to the SMEs based within this consortium they can use it along with their *in vivo* data collected across the 5 RTD sites to demonstrate to their customers the usefulness of their additives and with their other on farm data they can build this into a useful demonstration tool when selling to primary producers or into the feed manufacturing business.

Disclaimer to use

The calculators have been provided as a demonstration tool and do not contain values associated with a particular SME partners product. It is intended to help assist in marketing and sales of the SME partners who have additional data to support their findings. All assumptions to our knowledge are sound and are acceptable at time of production. The calculator can be modified by individual SME partners in collaboration with the RTD authors. The calculator provides an indication based upon the information supplied. It does not perform a life cycle assessment but can be used to generate data more scientifically than a Tier 1 approach. We accept no responsibility for the use or misuse of the calculator.