Introduction

- Methane from ruminal fermentation (enteric methane): 40% of total emissions of the agriculture sector (Gerber et al., 2014).
- One possibility to decrease them = improvement of feeding strategies

LIFE DAIRYCLIM
Aims to improve feeding strategies regarding methane emissions, carbon footprint and feeding costs
At barn: Test of concentrations of different composition
During the grazing season: Improving of grazing management

Material and methods

- Trials were held in 2 Walloon experimental farms at barn and at grazing
- At Barn: Ration offered:
  - TMR based on forages + concentrates of different composition
  - 2 groups of Holstein cows with similar days in milk – production level
- 1 received tested concentrate (conc) = 1 received the control conc

In 2015-2016: Conc rich in Starch vs Control
Conc rich in Fat vs Control
In 2016-2017: Extruded Linseed (ELS) vs Control Canola seed (CS) vs Control

Objectives: reach a decrease of methane emissions by 10%

Measurements:

- Methane: in breath samples (sniffer method)
  - analysis of milk spectra => predictions
- Carbon footprint: Feedprint®
- Feeding costs: accountancy + software « Dégâts du Gibier » (Fourrages/Mais)

Composition of the diets during the trials

<table>
<thead>
<tr>
<th>Year of trial</th>
<th>2015-2016</th>
<th>2016-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>% DMI</td>
<td>ST vs control</td>
<td>Fat vs control</td>
</tr>
<tr>
<td>Forages</td>
<td>60</td>
<td>56</td>
</tr>
<tr>
<td>By-products</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Conc. rich in protein</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Concentrate</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Total DMI</td>
<td>19.5 kg</td>
<td>20.6 kg</td>
</tr>
</tbody>
</table>

Abbreviations: DMI: dry matter intake; ST: starch; ELS: extruded linseed; CS: canola seed

Results

Methane emissions

- Methane in breath samples (sniffer method)

Control 2016: Starch |
Control 2017: ELS |
Control 2016: Starch |
Control 2017: ELS |

Abbreviations: ELS: extruded linseed; CS: canola seed; Values are LSMeans. *: p<0.05; ***: p<0.01

Feeding costs

<table>
<thead>
<tr>
<th>Year of trial</th>
<th>2015-2016</th>
<th>2016-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forages</td>
<td>24.8</td>
<td>78.8</td>
</tr>
<tr>
<td>Barley</td>
<td>-</td>
<td>4.2</td>
</tr>
<tr>
<td>By-products</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Concentrate</td>
<td>71.5</td>
<td>16.1</td>
</tr>
<tr>
<td>Grazed grass</td>
<td>-</td>
<td>83.9</td>
</tr>
<tr>
<td>Total DMI</td>
<td>21.4</td>
<td>18</td>
</tr>
</tbody>
</table>

Abbreviations: DR: dry ration; Values are LSMeans. *: p<0.05

Results

Methane emissions

- Methane in breath samples (sniffer method)

Control 2016: Starch |
Control 2017: ELS |
Control 2016: Starch |
Control 2017: ELS |

Abbreviations: ELS: extruded linseed; CS: canola seed; Values are LSMeans. *: p<0.05; ***: p<0.01

Conclusion

Diminution of enteric methane with concentrates rich in Fat
Depends on the % fat - nature of components: ELS > CS
Grazing: decrease of feeding costs in relation with % grazed grass
Climate impact: variable impact => positive impacts could be counteracted by negative ones = to be considered in decision making!!!!!