



HAL
open science

Mitigating GHG emissions from ruminant livestock systems

Katja Klumpp, Michel Doreau, Philippe Faverdin, Marie-Helene Jeuffroy, Laure Bamière, Lenaïc Pardon, Jean-François Soussana, Sylvain Pellerin

► To cite this version:

Katja Klumpp, Michel Doreau, Philippe Faverdin, Marie-Helene Jeuffroy, Laure Bamière, et al.. Mitigating GHG emissions from ruminant livestock systems. 3. Climate Smart Agriculture, Mar 2015, Montpellier, France. 2015, Abstracts of the climate smart agriculture 2015. hal-01211041

HAL Id: hal-01211041

<https://hal.science/hal-01211041>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

122. Mitigating GHG emissions from ruminant livestock systems

Klumpp Katja¹, Doreau Michel², Faverdin Philippe³, Jeuffroy Marie-Hélène⁴, Bamière Laure⁵, Pardon Lénaïc⁶, Soussana Jean-François⁷, Pellerin Sylvain⁸

¹INRA UR 874 Ecosystème prairial 5 Ch de Beaulieu, 63039 Clermont-Ferrand, France

²INRA/ VetAgroSup UMR 1213 Herbivores, Theix, 63122 Saint-Genès-Champanelle, France

³INRA/Agrocampus Ouest, UMR 1348 Pegase, 35590 Saint-Gilles, France

⁴INRA-AgroParisTech, 78850 Thiverval-Grignon, France

⁵INRA UMR Economie Publique BP 01 78850 Thiverval-Grignon, France

⁶INRA DEPE 147 rue de l'Université, 75338 PARIS CEDEX 07, France

⁷INRA Département Environnement et Agronomie, 33883 Villenave d'Ornon Cedex, France

Improving the net GHG budget of ruminant livestock systems without a reduction in productivity and economic sustainability, requires effective mitigation options in terms of abatement potential and costs. Grasslands and grassland management have a large potential to mitigate livestock GHG emissions at a low (or even negative) cost. A synthesis of eddy flux covariance data (*i.e.* 189 site years) shows on a mean net carbon storage equal to $0.76 \pm 0.1 \text{ MgC m}^{-2}\text{yr}^{-1}$, indicating a significant carbon sequestration of grasslands in Europe. Simple calculations showed that C sequestration of grasslands can compensate for other GHG emissions on site (*i.e.* enteric CH₄ and soil N₂O in CO₂e) by staying close/below a critical stocking rate and moderate fertilizer application. However, to implement these findings into effective mitigation options, in terms of technical feasibility, abatement potential and costs of implementation, Life Cycle Assessments are required. For France, a national abatement study has been dedicated to identify and assess mitigation options without production losses at farm level. In addition to grassland management, two other actions have been identified for livestock farms (*i.e.* ruminants): reduction of enteric CH₄ through addition of oilseeds or nitrates in the diet and reduction of nitrogen losses by decreasing dietary protein in dairy cows. The selected measures were quantified concerning their abatement potential and costs using a marginal abatement cost curve approach. In terms of unitary abatement potential (Mg CO₂e avoided per ha or head) the most interesting measures are: increase in %legume, reduction dietary protein and nitrate addition to diet. When implemented on national basis, the addition of oilseeds and the increase of legume fraction had the highest abatement potential. In terms of abatement costs (€ per Mg CO₂e) the most attractive measures are the extension of grazing season, increase in legumes content and a 10% reduction in fertilisation.