

GLOBAL RESEARCH ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

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FEED ADDIVITES FLAGSHIP PROJECT



LRG Annual Meeting
Lyon, 1st September 2023

Flagship Project – Background and goal

PNAS

RESEARCH ARTICLE | SUSTAINABILITY SCIENCE

OPEN ACCESS



Full adoption of the most effective strategies to mitigate methane emissions by ruminants can help meet the 1.5 °C target by 2030 but not 2050

Claudia Arndt^{a,1}, Alexander N. Christov^b, William J. Price^c, Shelby C. McClelland^d, Amalia M. Pelaez^{b,e}, Sergio F. Cueva^b, Joonpyo Oh^b, Jan Dijkstra^a, André Bannink^a, Ali R. Bayat^a, Les A. Crompton^a, Maguy A. Eugène^b, Dolapo Enahoro^a, Ermias Kebebew^a, Michael Kreuzer^a, Mark McGee^a, Cécile Martin^b, Charles J. Newbold^d, Christopher K. Reynolds^a, Angela Schwarm^m, Kevin J. Shingfield^d, Jolien B. Veneman^a, David R. Yáñez-Ruiz^a, and Zhongtang Yu^a

MITIGATION STRATEGY		POTENTIAL EMISSIONS REDUCTION	
Product-Based Reductions	1 INCREASING FEEDING LEVEL	CH ₄ IM -17%	CH ₄ G No Data
	2 DECREASING GRASS MATURITY	CH ₄ IM -13%	CH ₄ G No Data
	3 DECREASING DIETARY FORAGE-TO-CONCENTRATE RATIO	CH ₄ IM -9%	CH ₄ G -9%
Absolute Reductions	1 CH ₄ INHIBITORS	CH ₄ IM -32%	Daily CH ₄ -35%
		CH ₄ G No Data	CH ₄ Y -34%
	2 TANNIFEROUS FORAGES	CH ₄ IM -18%	Daily CH ₄ -12%
		CH ₄ G No Data	CH ₄ Y -10%
	3 ELECTRON SINKS	CH ₄ IM -13%	Daily CH ₄ -17%
	CH ₄ G -12%	CH ₄ Y -15%	
4 OILS & FATS	CH ₄ IM -12%	Daily CH ₄ -19%	
	CH ₄ G -22%	CH ₄ Y -15%	
5 OILSEEDS <small>Lactating animals only</small>	CH ₄ IM -12%	Daily CH ₄ -20%	
	CH ₄ G No Effect	CH ₄ Y -14%	

Arndt et al., 2022

An evaluation of evidence for efficacy and applicability of methane inhibiting feed additives for livestock

November 2021

Hegarty et al., 2021

Additive	Efficacy		
	CH ₄ reduction potential ¹	No. of academic papers ²	Confidence in efficacy ³
3-Nitrooxypropional	Very High	> 20	5
Asparagopsis	Very High	< 10	1
Nitrate	High	< 20	4
Essential Oils	Low	< 20	2
Saponin	Low	< 15	1
Tannins	Low	< 15	2
Monensin	Low	> 20	5
Microalgae	Low	< 5	1
Biochar	Low	< 5	1
Bacterial Direct Fed Microbes	Low	< 15	2
Fungal Direct Fed Microbes	Low	< 15	1

- Facilitate the development and use of feed additives to reduce enteric methane emissions

Flagship Project - Goal

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Technical guidelines on good practice on how to develop and test feed additives, as well as for accounting for the effect of using this mitigation strategy

Global network of experts to share knowledge, discuss and create the technical guidelines

Conceived to help both academy and industry

Flagship Project – Guidelines topics



Flagship Project – Working groups leaders

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WG1

Evert Duin
United States

Zoey Durmic
Australia

WG2

Alex Hristov
United States

Peter Lund
Denmark

WG3

Jan Dijkstra
Netherlands

Ermias Kebreab
United States

WG4

Alejandro Belanche
Spain

Emilio Ungerfeld
Chile

WG5

Juan Tricarico
United States

WG6

Agustín del Prado
Spain

Ronaldo Vibart
New Zealand

Flagship Project – WG Members

53 Members from 22 countries from: **Asia** **Europe** North America **Latin America** **Oceania**

WG1

Wang M.

Carro M.D., Fievez V., Joch M.
Terranova M.
Benchaar C.

Carbone V., Muetzel S.

Belanche A., Yáñez-Ruiz D.R.
Garcia F., Ungerfeld E.
Hristov A.

WG2

Battelli M., Kenny D., Lind V., Meo Zilio D., Peiren
N., Ramin M., Rapetti L., Schwarm A., Stergiadis S.,
Theodoridou K., van Gastelen S., Waters S.
Cajarville C., Fernandez Turren G., Muñoz C.

Ramirez Agudelo F.

Jonker A., Meale S., Pacheco D.

Bannink A., Belanche A.
Garcia F., Ungerfeld E.

WG3

Eugene M., Niu M.
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Bannink A.
Hristov A.
Vibart R.

WG4

Godoy Santos F., Huws S.,
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Guan L., McAllister T., Pitta D.
Denman S., Muetzel S.

Dijkstra J., Yáñez-Ruiz D.R.
Garcia F.

WG5

Newbold J.
Van der Saag M., Waite J.

Yáñez-Ruiz D.R.

WG6

Faverin F., Henrique F., Leite F.,
Lopes da Silva A.
Bilotto F., Mazzetto A., Ridoutt B.,
Winslow E.

Bannink A., Dijkstra J.

Flagship Project – Output and timeline

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Special issue on:

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Timeline:

- Manuscript ready – December 2023
- Internal revision – Start of 2024
- Manuscripts submission – In mid-2024

- **Collaboration:**

MiLCA Project, EDF, Cornell University,
UC Davis

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Thank you!