

GLOBAL RESEARCH ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

David Yáñez-Ruiz (CSIC, Spain), André Bannink (WUR, Netherlands), Florencia García (Argentina)



FEED ADDIVITES FLAGSHIP PROJECT

Background

Feed additives are a valuable strategy to reduce methane emissions from ruminants

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

PNAS RESEARCH ARTICLE SUSTAINABILITY SCIENCE OPEN ACCESS

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NEW ZEALAND AGRICULTURAL GREENHOUSE GAS RESEARCH CENTRE

RESEARCH PROGRAM ON CLIMATE CHANGE, AGRICULTURE AND FOOD SECURITY

CGIAR CCAFS

Effective strategies to mitigate methane emissions can help meet the 1.5 °C target

Amalia M. Pelaez^{a,c}, Sergio F. Cueva^b, Joonpyo Oh^b, Eugène^b, Dolapo Enahoro^a, Ermias Kebreab^b, Christopher K. Reynolds^b, Angela Schwarm^b, Kevin J. Shingfield^{d,2}



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

November 2021

Worldwide:

- Increasing interest in developing feed additives
 - Extensive research effort over the last decades
- ...BUT few additives available in the market

Flagship Project Goals and expected outcomes/impacts

- **Facilitate the development and use of feed additives to reduce enteric methane emissions**
[Technical guidelines and protocols](#) on good practice on how to develop and test feed additives, as well as for accounting for the effect of using this mitigation strategy
- **Improve academic and industry capability to develop feed additives and contribute to efficacy assessment**
[Global network of experts](#) to share knowledge and create detailed guidance to enable the livestock sector to collaboratively harness the potential that feed additives offer

Flagship Project Members

- **110 Members:**

Region (n° Members)

Africa (1)

Asia (2)

Europe (44)

Latin America (32)

North America (12)

Oceania (19)

From 27 countries

- **Partners:**

MiLCA Project, EDF, Cornell University, UC Davis



Activities/Results To Date

- Outline the structure of the Technical Guidelines (November 2022)
- Define Working Groups (December 2022)
- Invite members – Self allocation into WGs (Dec 2022 – Feb 2023)
- Identify and invite WG leaders (Feb – April 2023)

Working group	Leaders
WG1 - Identification of new bioactive compounds	Evert Duin (United States) + Zoey Durmic (Australia)
WG 2. Testing at animal level (in vivo assessments)	Alex Hristov (United States) + Peter Lund (Denmark)
WG 3. Modelling (animal, farm)	Jan Dijkstra (The Netherlands) + Ermias Kebreab (United States)
WG 4. Uncovering the modes of action	Alejandro Belanche (Spain) + Emilio Ungerfeld (Chile)
WG 5. Registration and regulation of feed additives	Juan Tricarico (United States)
WG 6. Accounting at Farm, Regional, National or Global level	Agustín del Prado (Spain) + Ronaldo Vibart (New Zealand)

Guidelines structure

First drafts by the end of 2023

Working group	Topics to cover
WG1 - Identification of new bioactive compounds	In vitro, in silico screening, dosage in vitro – in vivo
WG 2. Testing at animal level (in vivo assessments)	Experimental design, animal species, measuring techniques, adaptation periods, delivery methods, grazing systems
WG 3. Modelling (animal, farm)	Metanalysis for assessing effectiveness, modelling at rumen and animal, farm levels
WG 4. Uncovering the modes of action	Assessing the 4 main mechanisms of action, molecular/culturomics techniques, H2 dynamics, resistance
WG 5. Registration and regulation of feed additives	Regulatory contexts around the world
WG 6. Accounting at Farm, Regional, National or Global level	Carbon markets, inventories, monitoring/reporting/verification (MRV)

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Thank you

A photograph of a field of golden-brown grain, likely sorghum, under a warm, hazy sky. The grain is in the foreground, and the background shows rolling hills and a bright sun, creating a soft, golden light.