

Combining rapeseed meal with brewers' grains lowers methane emission intensity and the carbon footprint in dairy cows

D. Van Wesemael, L. Vandaele, S. De Campeneere, V. Fievez & N. Peiren
EAAP 2019 – August 26, 2019 – Ghent, Belgium

FLANDERS
INNOVATION &
ENTREPRENEURSHIP



Flanders
State of the Art

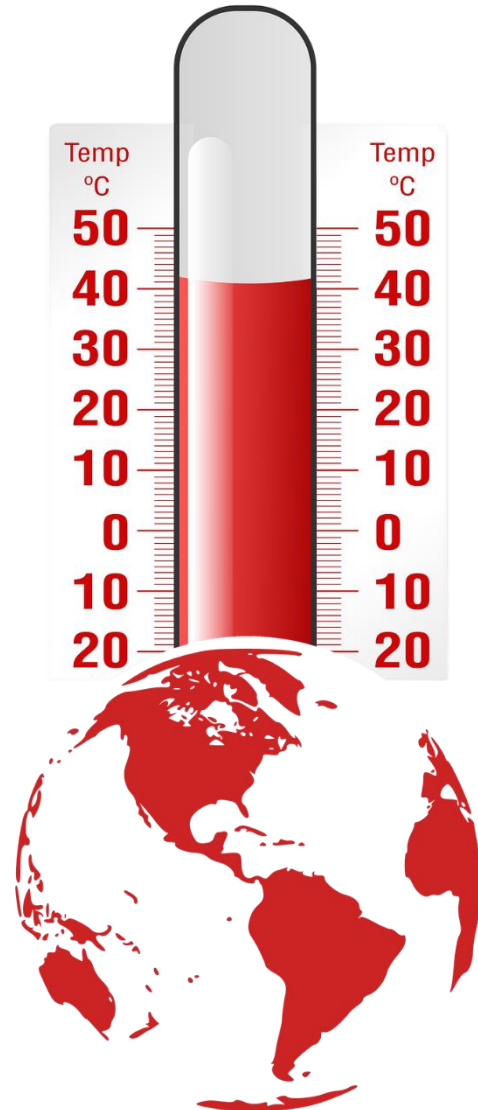
Innovatiesteunpunt



ILVO

Introduction

Climate change
Global warming



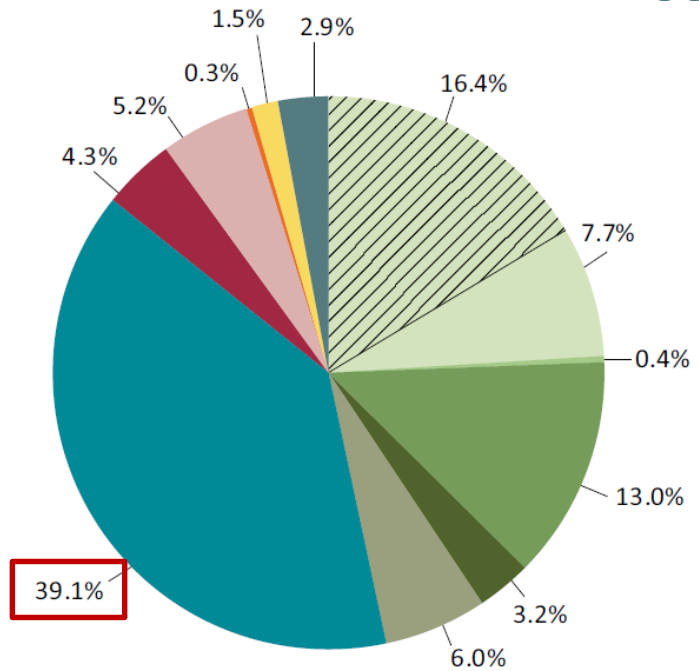
Paris Agreement

Aims at limiting
the temperature
increase to 1.5 °C



Reduction of
greenhouse gas
emissions

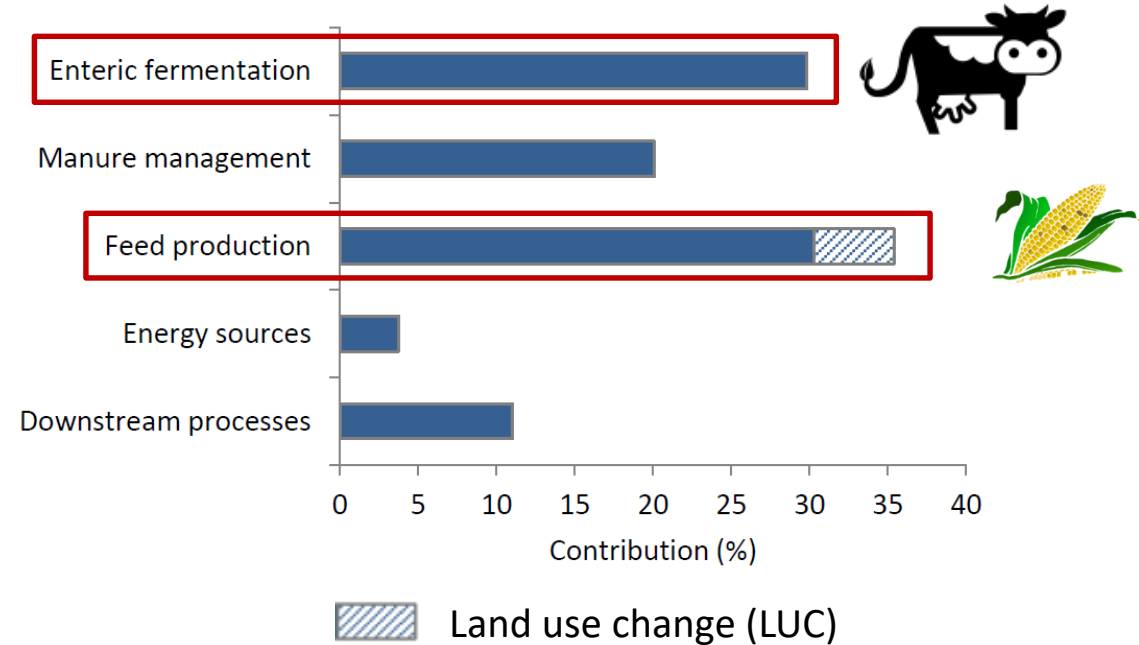
Introduction



- Applied & deposited manure, N₂O
- Fertilizer & crop residues, N₂O
- Feed: rice, CH₄
- Feed, CO₂
- LUC: soybean, CO₂
- LUC: pasture expansion, CO₂

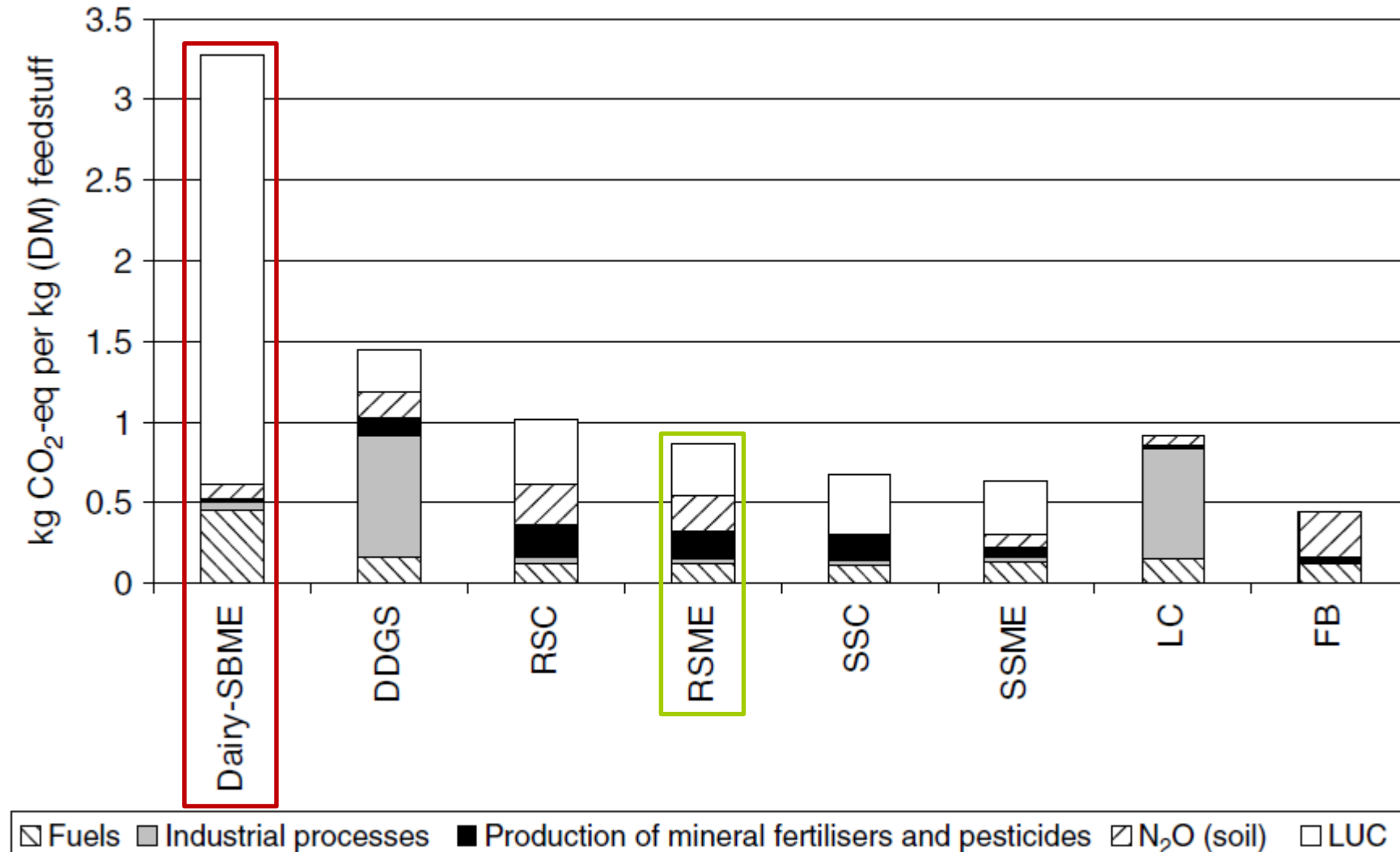
- Enteric, CH₄
- Manure management, CH₄
- Manure management, N₂O
- Indirect energy, CO₂
- Direct energy, CO₂
- Postfarm, CO₂

(Gerber et al., 2013)



(van Middelaar, 2014)

Introduction



(Hörtenhuber et al., 2011)

Materials and Methods

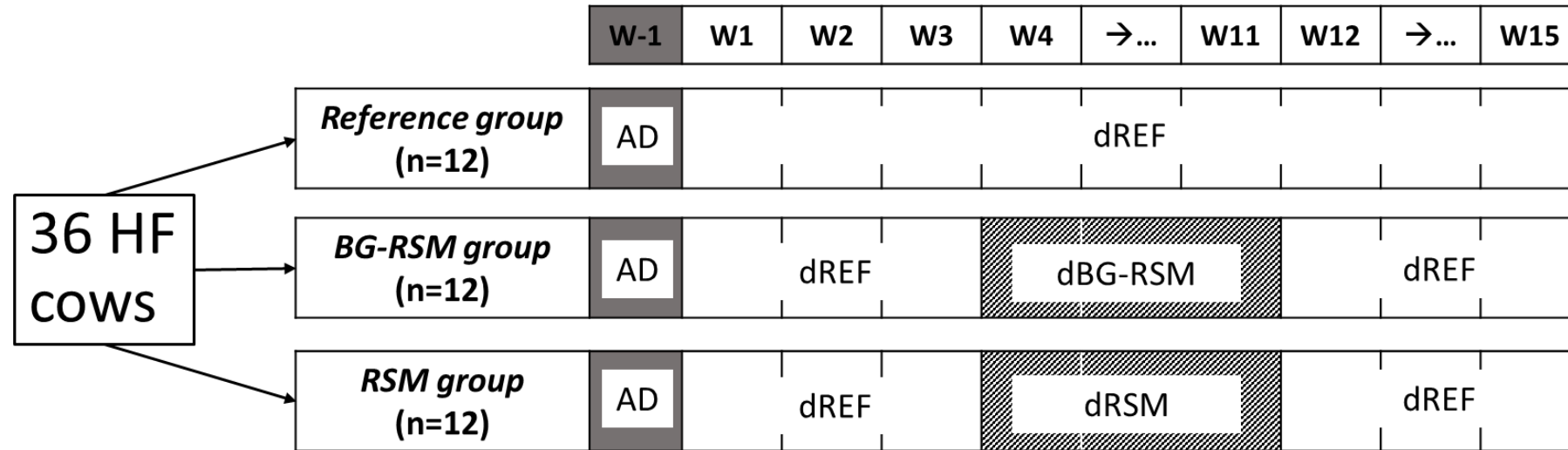


Rapeseed meal (residue from oil extraction)



Brewers' grains (residue from brewing beer)

Materials and Methods



dREF = reference diet with soybean meal

dBG-RSM = diet with brewers' grains and rapeseed meal

dRSM = diet with rapeseed meal

Animals

36 Holstein Friesian (HF) cows

97 ± 39 DIM (days in milk)

35,5 ± 4,8 kg milk day⁻¹

Diet characteristics (g/kg DM)

	dREF	dBG-RSM	dRSM
DM (g/kg)	449	424	445
Crude protein	158	162	158
Ether extract	34	40	35
VEM (/kg DM)	992	963	960
DVE	94	90	86
OEB	5	10	9
FOM	602	567	582

MS = maize silage

GS = grass silage

BG = brewers' grains

SBM = soybean meal

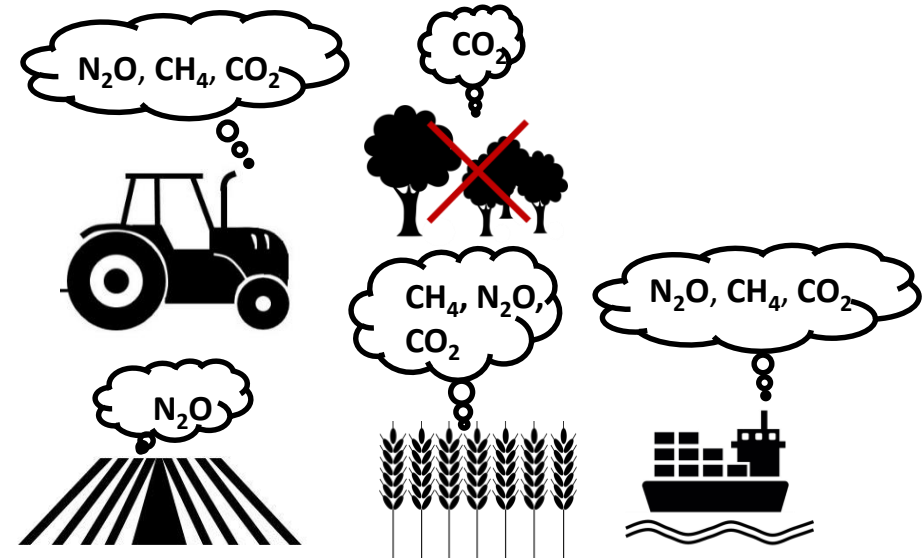
RSM = rapeseed meal

Conc. = concentrates

Materials and Methods



GreenFeed-unit in a free stall with cubicles



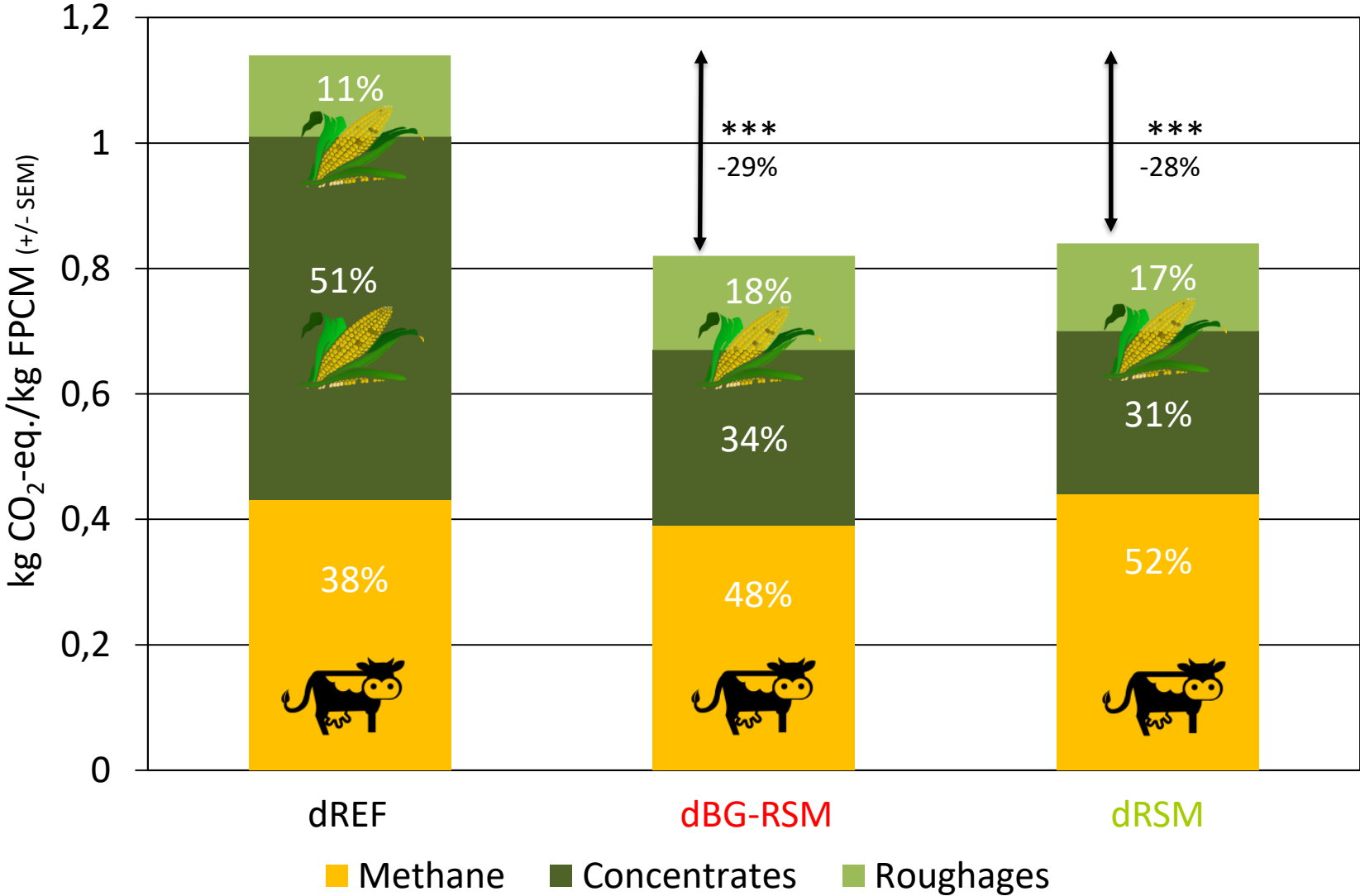
Results - performance

	Treatment			SEM
	dREF	DBG-RSM	dRSM	

Results - methane

	Treatment			SEM
	dREF	DBG-RSM	dRSM	

Results – carbon footprint



Discussion

- This *in vivo* study confirmed the effect of the combination **brewers' grains + rapeseed meal** on CH₄ emissions.
 - In a previous *in vivo* trial the combination of BG and RSM reduced methane intensity (g CH₄/kg FPCM) with 10%.

Discussion

- This *in vivo* study confirmed the effect of the combination **brewers' grains + rapeseed meal** on CH₄ emissions.
 - In a previous *in vivo* trial the combination of BG and RSM reduced methane intensity (g CH₄/kg FPCM) with 10%.
- RSM alone showed potential for reducing CH₄ production (g CH₄/day) and CH₄ yield (g CH₄/kg DMI), but **not** for reducing CH₄ emission intensity (g CH₄/kg FPCM)

Discussion

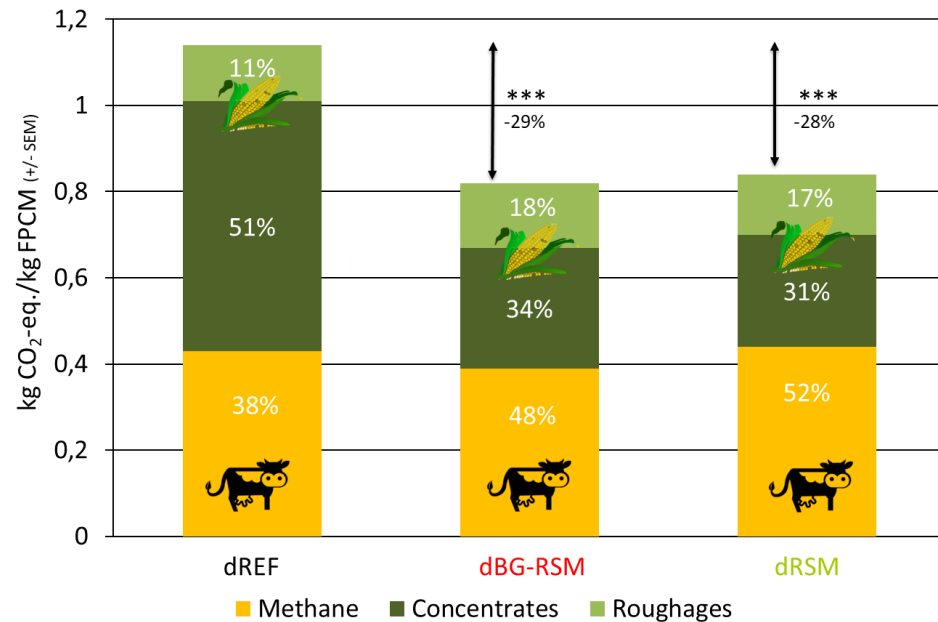
- This *in vivo* study confirmed the effect of the combination **brewers' grains + rapeseed meal** on CH₄ emissions.
 - In a previous *in vivo* trial the combination of BG and RSM reduced methane intensity (g CH₄/kg FPCM) with 10%.
- RSM alone showed potential for reducing CH₄ production (g CH₄/day) and CH₄ yield (g CH₄/kg DMI), but **not** for reducing CH₄ emission intensity (g CH₄/kg FPCM)
- For both treatment diets the DMI was increased, but only the combined diet resulted in a higher FPCM production

Discussion

- This *in vivo* study confirmed the effect of the combination **brewers' grains + rapeseed meal** on CH₄ emissions.
 - In a previous *in vivo* trial the combination of BG and RSM reduced methane intensity (g CH₄/kg FPCM) with 10%.
- RSM alone showed potential for reducing CH₄ production (g CH₄/day) and CH₄ yield (g CH₄/kg DMI), but **not** for reducing CH₄ emission intensity (g CH₄/kg FPCM)
- For both treatment diets the DMI was increased, but only the combined diet resulted in a higher FPCM production
- Reducing the amount of soybean meal in the diet lowers the carbon footprint of feed production

Conclusion

Replacing soybean meal by alternative protein sources in smart combinations allows to reduce the carbon footprint of dairy production systems at feed and enteric CH₄ level



Thank you! Questions?



Dorien Van Wesemael

**Flanders Research Institute for Agriculture,
Fisheries and Food**

**Scheldeweg 68
9090 Melle – Belgium
T + 32 (0)9 272 26 64**

**dorien.vanwesemael@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be**

**FLANDERS
INNOVATION &
ENTREPRENEURSHIP**



Flanders
State of the Art

Innovatiesteunpunt 



ILVO