



# Effects of *Hibiscus sabdariffa* on dry matter disappearance and greenhouse gas emissions in dairy cows

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## Introduction

- Dairy cows remain the major contributor of anthropogenic greenhouse gas (GHG) emission (EPA, 2017).
- Reducing GHG emission in ruminants will save at least 2 to 12% of dietary gross energy (Johnson and Johnson, 1995).
- Inclusion of important nutraceutical plant such as *Hibiscus sabdariffa* L. (Malvaceae) in the diets of dairy cows can reduce GHG emission.
- Our objective was to improve digestibility and reduce GHG emission in dairy cows using *H. sabdariffa*.

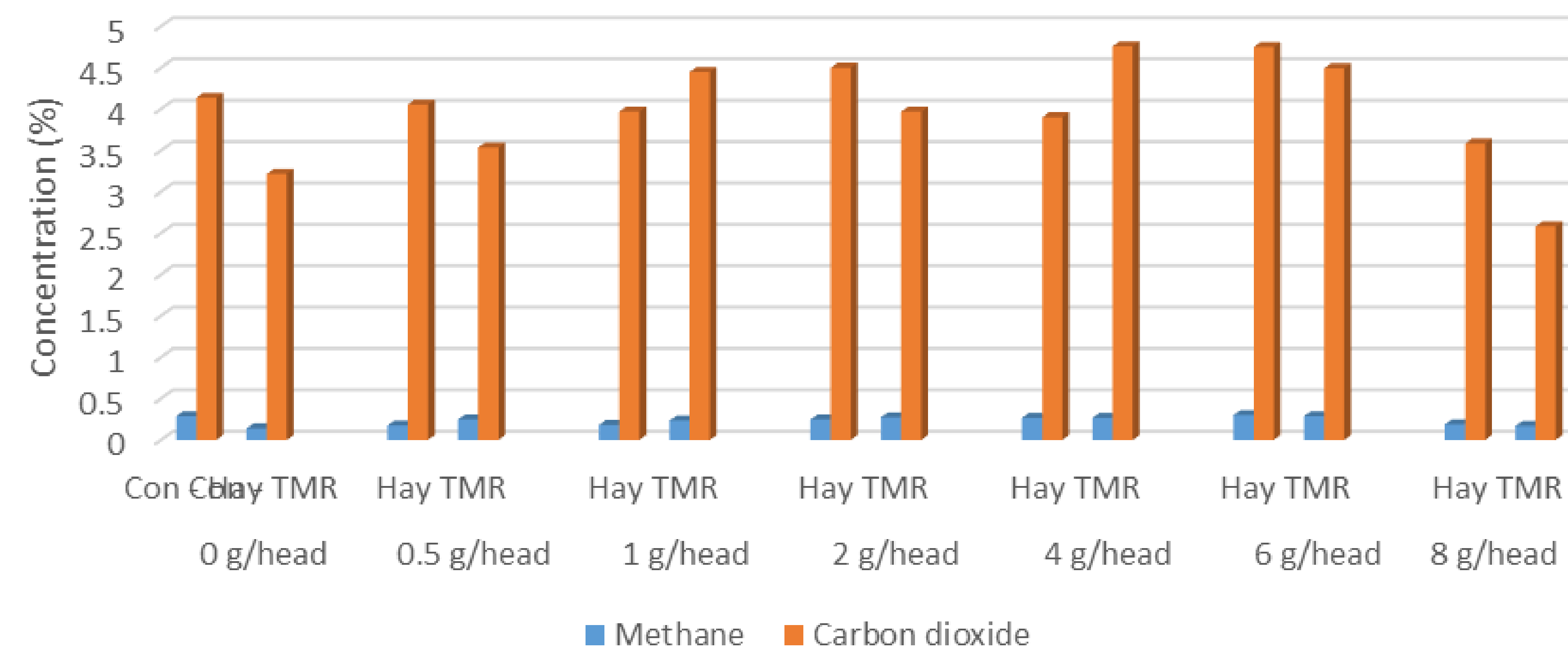
## Materials and Methods

- The calyces of *H. sabdariffa* at six different doses (0, 0.5, 1, 2, 4, 6 and 8 g/head) were used in the present study.
- Two dairy diets – alfalfa hay and total mixed ration were used as substrates.
- The study was arranged in a 2 x 6 factorial design with 3 replicates.
- In vitro gas production was measured at 3, 6 and 24 h of incubation using inoculum from 2 cannulated dairy cows fed standard diet at the CAES University Farm.
- We estimated the amount of methane, carbon dioxide, hydrogen sulfide, ammonia, oxygen and dry matter disappearance after 24 h of incubation.

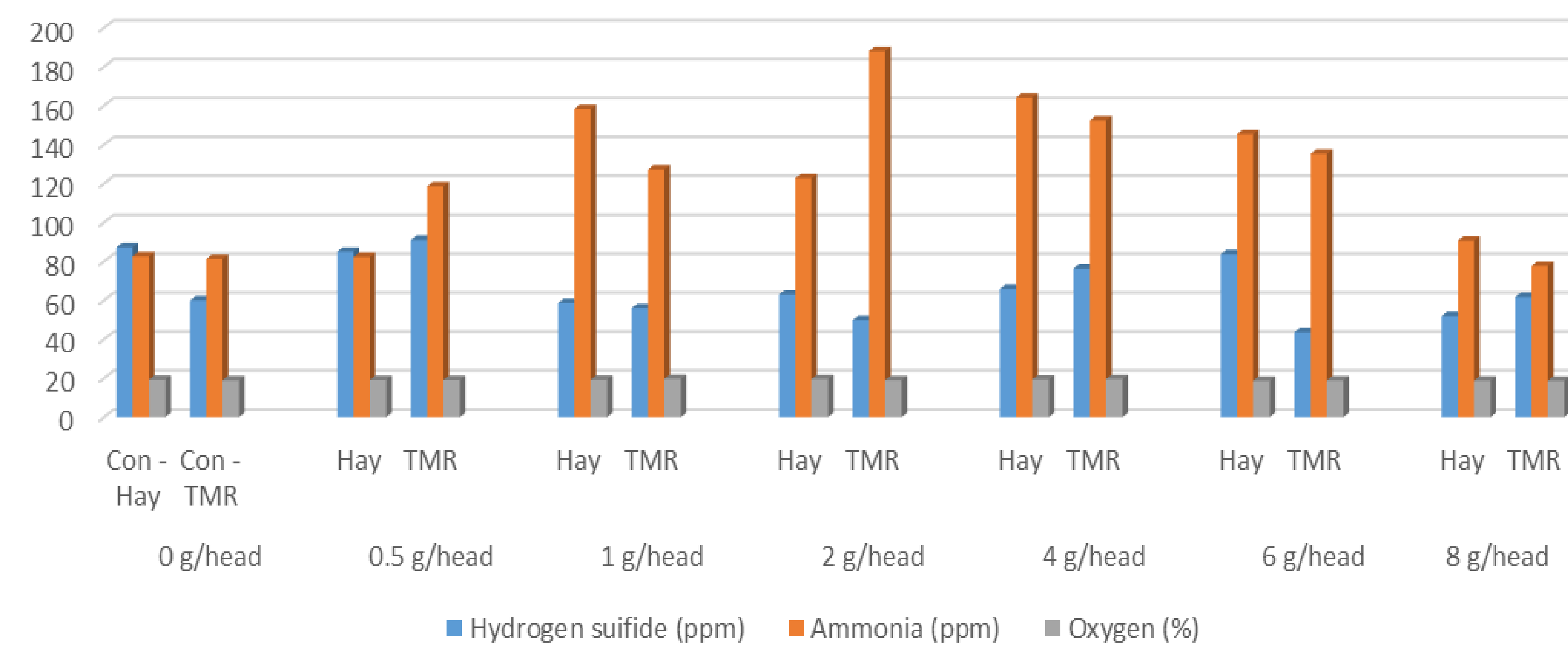


## Results

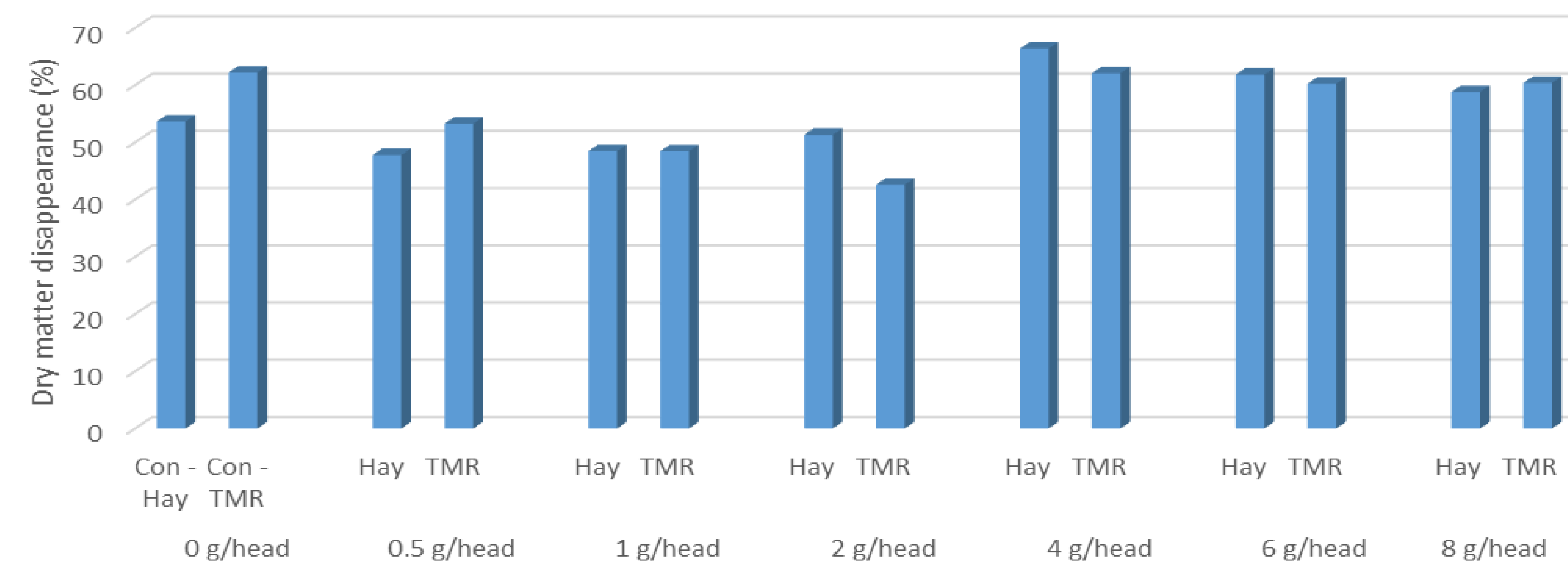
Greenhouse gas emissions of two dairy diets supplemented with different levels of *Hibiscus sabdariffa* calyces



Dose response of *Hibiscus sabdariffa* calyces on ruminal gas profile of dairy cows fed either alfalfa hay or total mixed ration

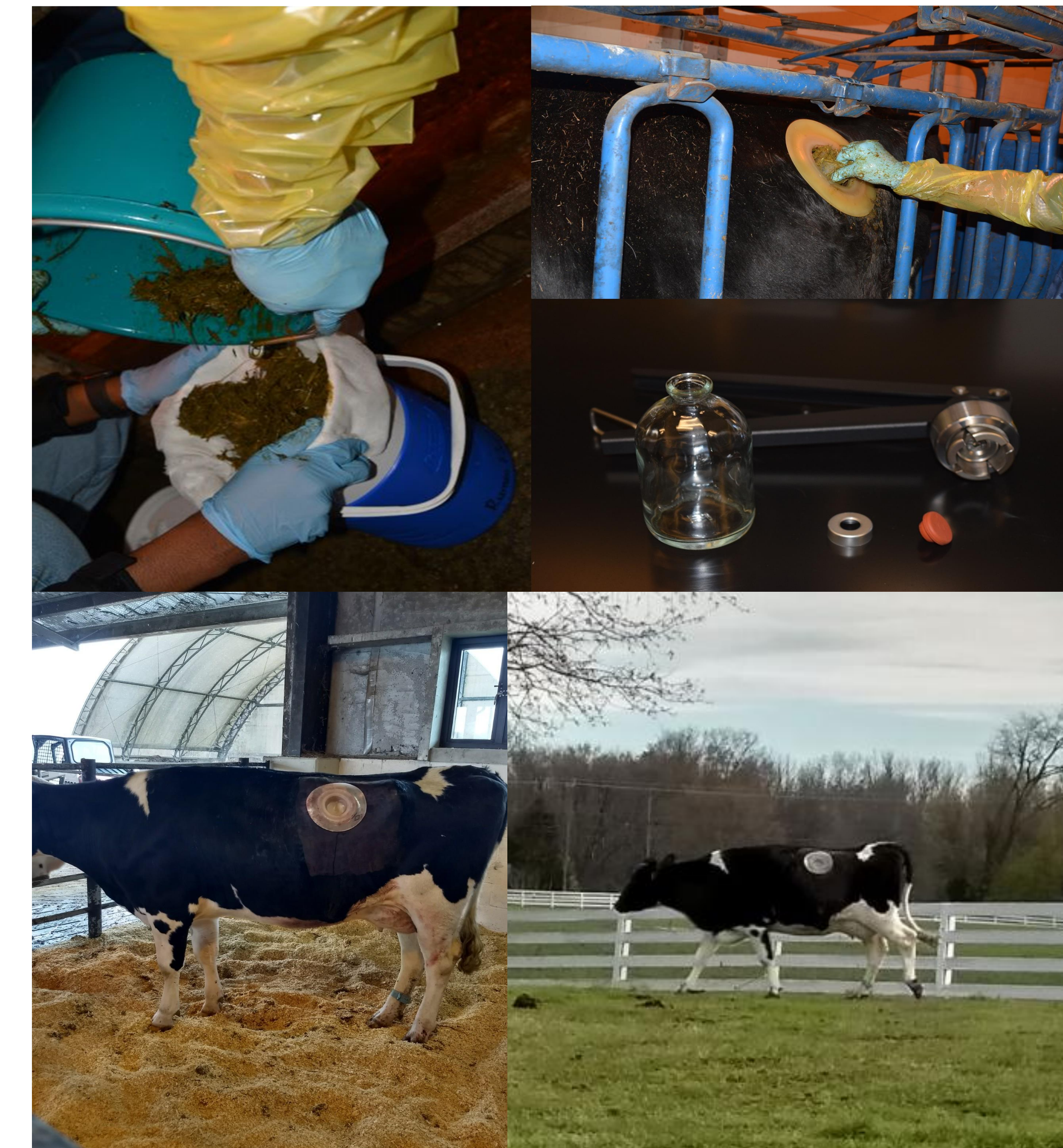


Effects of *Hibiscus sabdariffa* on dry matter disappearance of dairy diets after 24 h of fermentation



## Results and Discussion

- H. sabdariffa* reduced methane production in all the hay treatments except at 6 g/head inclusion level.
- H. sabdariffa* had no effect on the total mixed ration at all inclusion levels.
- We observed small numerical reduction in carbon dioxide in all but two inclusion levels.
- Inclusion levels of 1, 2 or 6 g/head reduced hydrogen sulfide in both diets.
- About 25% increase in dry matter digestibility was noted for 4 g/head treatment.
- Further studies are planned to validate results.



## Acknowledgements

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