

Increasing inclusion rates of green algae residues on ruminal in vitro fermentation profile and methane production

Juan Vargas, Araceli Maderal, Ignacio Fernández-Marenchino, Federico Tarnonsky, Federico Podversich, Wilmer Cuervo, Camila Gómez, Tessa M. Schulmeister, and Nicolás DiLorenzo
University of Florida, North Florida Research and Education Center, Marianna, FL 32446

Introduction & Objective

- Algae and algae residues (AR) have been incorporated in ruminants' diets to increase crude protein concentration, modify ruminal fermentation, and reduce methane emissions
- Algae and AR show considerable variability in chemical composition and secondary compound content due to differences in algae type and environmental conditions resulting in different fermentation profiles
- The objective of this experiment was to evaluate increasing levels of AR of *Chlorella* sp. in a corn-silage diet on in vitro fermentation profile and methane production

Materials & Methods



- Ruminal fluid was collected from two Angus-crossbred steers fed *ad libitum* corn silage and cotton gin trash (70 and 30% of the diet DM, respectively)
- Incubations were conducted in three different periods (35, 42, and 49 days) using the same diet
- Treatments were control (without AR, CTL) and three increasing proportions of AR (1, 5, and 10%)
- Final pH, concentration of volatile fatty acids (VFA), ammonia nitrogen, in vitro organic matter digestibility (IVOMD), and methane production (CH₄) were determined after 24 h of incubation
- Variables were analyzed with a RCBD. Means were compared using orthogonal polynomial contrast. Significance was declared at P ≤ 0.05

Results

Table 1. Effects of increasing proportions of algae residue (AR) on ruminal in vitro fermentation with a corn silage-based substrate

Variable	CTL	AR inclusion (%)			SEM	P - value
		1	5	10		
pH	6.51	6.58	6.58	6.53	0.05	0.61
Total VFA, mM	28.36	25.89	28.96	26.82	2.84	0.12
Ammonia-N, mM	5.34	5.11	4.86	4.34	0.83	0.14

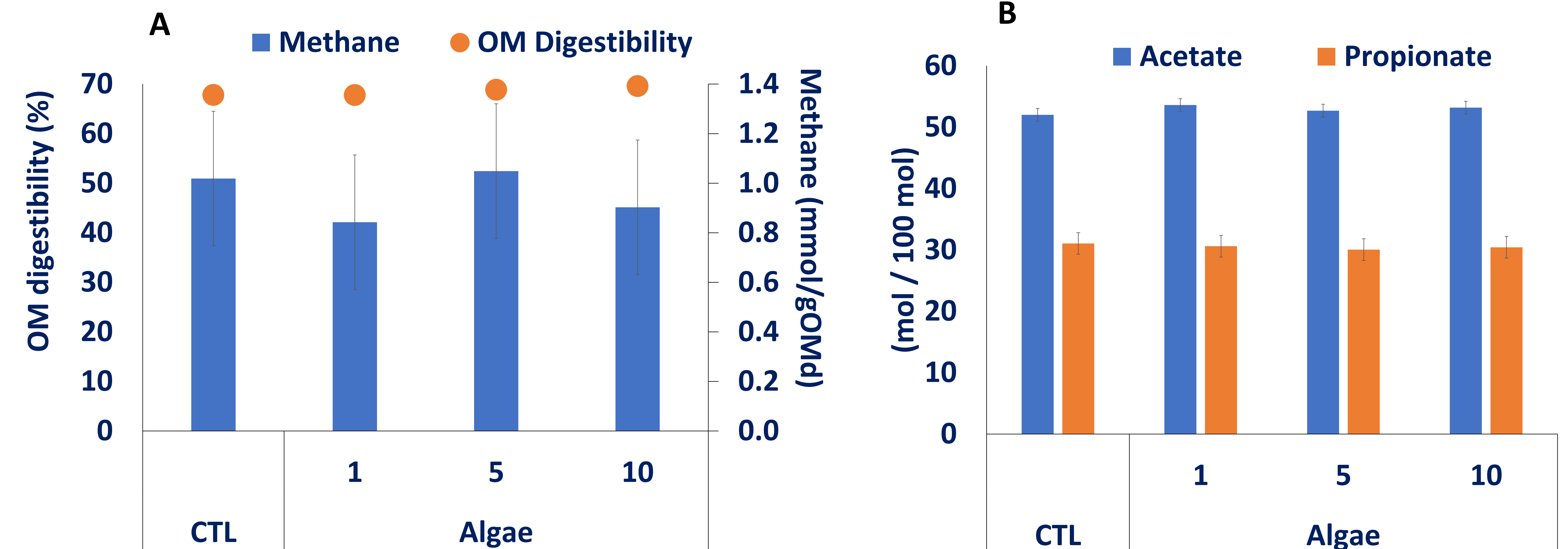


Figure 1. Effect of AR supplementation on: A. organic matter digestibility (%), P < 0.01 and methane production (mmol/gOMd), P > 0.05, B. acetate and propionate proportion (mol/100mol), P > 0.05 in a corn silage-based substrate

Conclusion

Increasing AR proportion of *Chlorella* sp. did not substantially modify the ruminal in vitro fermentation profile and CH₄ production in a corn-silage base substrate. Further research should be conducted using AR on the productive and economic of ruminant diets