

## Effect of including *Arachis pintoi* in tropical forages diets *Megathyrus maximus* and *Brachiaria humidicola* on *in vitro* methane production

Diana Marcela Valencia E<sup>1\*</sup>, Luis Alfonso Giraldo V<sup>1</sup>, Alexandra Torres<sup>2</sup>, Alejandra Marín Gomez<sup>1</sup>

<sup>1</sup>Universidad Nacional de Colombia, Medellín, Colombia

<sup>2</sup>Universidad de Antioquia, Medellín, Colombia

\*Corresponding author e-mail: dmvalenc@unal.edu.co

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### Introduction

Ruminants have the capability to ferment structural carbohydrates found in forages and obtain from them a usable form of energy to produce high quality food, i.e milk and meat (Kamra *et al.*, 2012). However, as a gaseous by-product from the enteric fermentation of those carbohydrates, methane is produced in a significant proportion, being considered as one of the most important greenhouse gases (GHG). In Colombian tropical livestock, inclusion of legumes in on poor quality grasses diets based have allowed an improvement of their nutritive quality, besides enteric methanogenesis reduction because their content of condensed tannins (CT); however, this is not always associated with all tropical legumes (Hess *et al.*, 2002). Therefore, the purpose of this study was evaluating the effect of including the tropical legume *Arachis pintoi* in diets based on *Megathyrus maximus* y *Brachiaria humidicola* over methane *in vitro* production.

### Materials and Methods

The experiment was conducted using the *in vitro* gas production technique described by Theodorou *et al* (1994); 500 mg of dry substrates were incubated in 110 ml bottles, corresponding to two grasses (P): *Megathyrus maximus* (Gui), *Brachiaria humidicola* (Bra), with 35 and 28 days of regrowth age respectively, further mixed with a legume (L) *Arachis pintoi* to form the treatments Gui:A and Bra:A, in a ratio 70:30 (grass: legume). During incubation, all bottles were left under controlled conditions to maintain microbial activity. Methane production and other variables were measured at 48h after *in vitro* incubation, under a 2\*2 factorial arrangement (2 grasses, 2 legume inclusions), in a randomized complete block design, where the effect of the inclusion of the legume (L) and its interaction with grasses (L\*P), were analysed. When ANOVA showed significant effect between treatments, media comparison by Tukey test was made with a 0.05 significance level by GLM procedure of SAS®.

### Results and Discussion

Inclusion of 30% of legume *Arachis pintoi* into diets based on the tropical grasses *Megathyrus maximus* and *Brachiaria humidicola*, had no effect on methane *in vitro* production (ml gDMD<sup>-1</sup> y ml gNDFd<sup>-1</sup>). The DMD and ammonia concentration increased with the legume inclusion, without affecting other parameters such as DNDF, pH and VFA (Table 1).

**Table 1.** Effect on *in vitro* CH<sub>4</sub> production by including *Arachis pintoi* in diets of grasses *Megathyrus maximus* and *Brachiaria humidicola*.

Item	Forage (P)	Legume inclusion (L)		SEM	P Value		
		100:0	70:30		P	L	L*P
DMD %	Gui	60.55	64.56	0.57	<.00001	<0.0001	0.12
	Bra	55.04	60.96				
DNDF %	Gui	56.42	56.71	0.61	<0.0001	0.06	0.12
	Bra	49.75	52.12				
pH	Gui	6.3	6.3	0.04	0.82	0.41	0.33
	Bra	6.3	6.4				
N-NH <sub>3</sub> (mg dl <sup>-1</sup> )	Gui	20.3	24.7	0.76	<0.0001	0.004	0.5
	Bra	9.5	16.0				
Gas volume (ml)	Gui	193.4	229.2	10.83	0.73	0.27	0.06
	Bra	212.7	202.4				
Total CH <sub>4</sub> (ml)	Gui	16.2	14.0	2.23	0.01	0.93	0.30

	Bra	20.6	23.1				
CH <sub>4</sub> (ml gDMd <sup>-1</sup> )	Gui	53.6	43.2	7.34	0.005	0.55	0.44
	Bra	74.3	75.7				
CH <sub>4</sub> (ml gNDFd <sup>-1</sup> )	Gui	80.4	79.4	10.6	0.002	0.07	0.08
	Bra	104.7	114.6				
Total VFA (mM)	Gui	50.9	50.4	1.15	0.57	0.06	0.12
	Bra	53.5	49.1				
mol 100 mol <sup>-1</sup>							
Acetate (A)	Gui	65.2	65.3	0.29	0.02	0.24	0.37
	Bra	65.7	66.3				
Propionate (P)	Gui	22.1	20.9	0.15	0.22	<0.0001	0.06
	Bra	22.2	20.4				
Butirate (B)	Gui	9.9	10.7	0.18	0.33	0.002	0.87
	Bra	10.2	10.9				
A:P	Gui	3.0	3.1	0.03	0.09	0.0001	0.10
	Bra	3.0	3.3				

SEM: Standard error of mean. *P* value <0.05

### Conclusion

Under these experimental conditions, inclusion of 30% of the legume *Arachis pintoi* in *Megathyrus maximus* and *Brachiaria humidicola* tropical grasses based diets does not affect CH<sub>4</sub> *in vitro* production.

### References

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