Nutritional quality of Brachiaria under two contrasting CO_2 environment conditions

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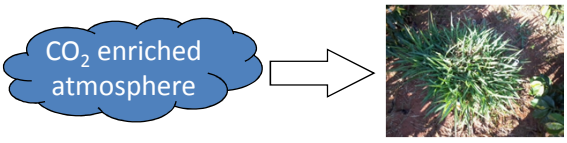
INTRODUCTION

Brazil's beef cattle production is grounded in Cerrado land grazing Brachiaria species and little data exists on potential changes in chemical composition and nutritional quality of tropical forages for livestock production under the scenario of CO_2 enriched atmosphere. The aim of this work was to determine the effects of elevated CO_2 concentrations upon the total biomass production and fibre quality of *Brachiaria decumbens*.

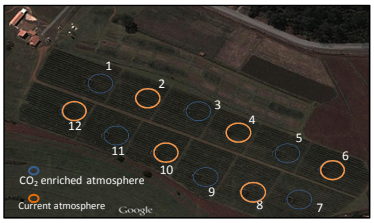


MATERIAL AND METHODS

Free Air Carbon-dioxide Enrichment (FACE) facility was established in twelve octagonal rings:

- Six rings being control treatment, were left under untreated conditions (current atmosphere),

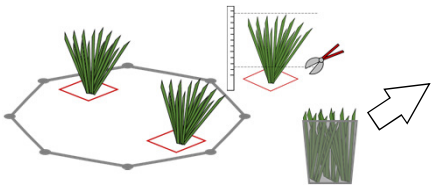
- Six rings treated with pure CO_2 to achieve the concentration of 200 ppm above ambient concentration.



- Within each ring, two plots have been established with *Brachiaria decumbens* and after a cut for standardization; forage availability was estimated every 28 days throughout 2012 and 2013.

- Samples of 0.25m^2 were collected from each plot, through cutting with scissors the grazing portion of the stand (at 20 cm height).

- Data was statistically analysed by GLM (model = CO_2 season year plot block).



- **Biomass availability**
- **Plant fractions**
- **Chemical determinations**
- **Fiber degradability**

RESULTS

- Elemental C, N and S composition (%) were not altered by enriched CO_2 atmosphere.

- Biomass available (1.34 vs 1.19 Kg fresh matter/m^2, (SE 0.018)) for enriched vs ambient were statistically affected by CO_2 conditions.

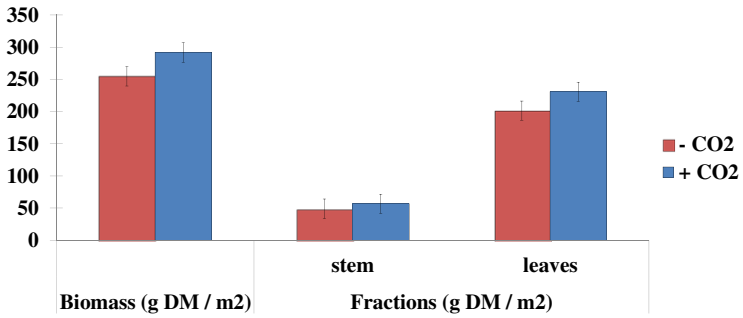


Figure 1 Biomass production and plant fractions (g DM/m^2) of *B. decumbens* grown under contrasting CO_2 atmosphere over two years of observation.

Table 1 Bromatological composition (g/Kg DM) of *B. decumbens* grown under contrasting CO_2 atmosphere over two years of observation.

CO_2	Bromatological composition (g/KgDM)						
	OM	CP	NDF	ADF	LIG	CEL	HEM
+ CO_2	921	200	640	326	60	266	314
- CO_2	923	192	637	321	61	260	316
SE	2.3	3.3	4.5	3.9	3.8	4.1	3.9
P > F	0.055	0.372	0.454	0.074	0.715	0.044	0.414

- The *in vitro* organic matter degradability (OMD) tended to be lower (P = 0.09) for the enriched conditions (599 vs 609 (SE 4.4) g/Kg DM), while there were no differences (P = 0.229) for the fibre degradability (42 ± 10.1 g/Kg).

CONCLUSION

The increase in pasture biomass available, in ADF content and reduction on OMD with CO_2 enrichment atmosphere suggest that there is a need to study nutrient ruminal availability for the sustainability of the ruminant production, whilst ambient CO_2 concentration maintain its increasing trend.

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