# NUTRITIONAL AND ENERGETIC CHARACTERIZATION OF BRACHIARIA BRIZANTHA AND CYNODON NLEMFUENSIS IN SINALOA, MEXICO

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## Introduction

*Brachiaria brizantha* and *Cynodon nlemfuensis* are grass species used by cattle owners in México and in many other countries for fattening stock. Seasonal variation along the year causes great nutritional and energetic variations in their morphological composition and in green and dry forage production (Morais *et al*., 1998), nutritive value, structural carbohydrates, lignine and maturity (Van Soest, 1982). Its nutritional and energetic characteristics are not always known in Sinaloa, México and during fattening, they affect results. For these reasons, conducted this experiment to characterize nutrient and energy profile of *Brachiaria brizantha* and *Cynodon nlemfuensis* in Sinaloa, Mexico.

## Materials and methods

Site of experiment

This experiment was carried out at Puerto Rico Dairy Ranch located in the San Lorenzo valley in Culiacán, Sinaloa, México.

Soil condition

Soil analysis was made at the beginning of the experiment.

Condition of the grasses

The grasses evaluated *Brachiaria brizantha* and *Cynodon nlemfuensis* weren't growing rapidly at the beginning of the experiment because of the relatively cold temperatures of winter.

*Management of grasses*

Grasses were managed according to the ranch practices, which include continuous irrigation and no fertilization during this period, besides, staggering rotation grazing and of 1.85 $ha^{-1}$ animal unit.

Experimental design and area

The experimental design was an incomplete randomize block and split plot. The area for both grasses was 1.164 ha.

Sampling and processing

Samplings were made from January to June 2003, using a 0.25 $m^2$ quadrant. They were stratified and weighed as leaves, green stalks and dead material.

Variables evaluated

Variables evaluated were 1) Bromatologic characterization: as Hemicellulose (H), Crude Protein (CP), Acid Detergent Fiber (ADF), Neutral Detergent Fiber (NDF) and Cell Content (CC), 2) Energy characterization as: Net Energy of maintenance (NEm), Net Energy of gain (NEg), Net Energy of lactation (NEl) that were estimated as Mcal kg $DM^{-1}$, and Total Digestible Nutrients (TDN %) (Jurgens, 1988; Undersander et al., 1993) 3) Morphological characterization as: Leaves, green stalks and dead material and 4) Dry matter production (DM).

Data analysis

Data were analyzed using PROC GLM and PROC MEANS (SAS, 1998).

## Results

Both soils were compose mainly by sand and clay and differed in fertility, organic matter and pH; nitrate and phosphates were low in both soils but calcium was high (Table 1). There were significant differences for the other variables, in all cases, *B. brizantha* showed the bests results ($P<0.05$) (Table 2), ADF and NDF contents are very high in this species. It is important to mention the high content of dead material of *C. nlemfuensis* (49.60%).

**Table 1. Chemical composition (fertility) of soils before the experiment.**

| | OM* | pH | CE-e | $N\text{-}NO_3$ | $P\text{-}PO_4$ | K | Ca | Mg | S | Fe | Cu | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % | | mmhos | ppm | ppm | ppm | ppm | ppm | ppm | Ppm | ppm | ppm |
| | | | | | | *Brachiaria brizantha* | | | | | | |
| March | 3.88 | 7.5 | 1.25 | 13.0 | 7.0 | 150 | 2860 | 360 | 25 | 42.5 | 4.5 | 1.6 |
| April | 4.05 | 7.5 | 1.18 | 10.0 | 6.0 | 145 | 2820 | 350 | 27 | 41.8 | 4.4 | 1.6 |
| May | 4.16 | 6.5 | 1.10 | 11.8 | 3.5 | 144 | 2780 | 340 | 26 | 37.5 | 4.6 | 1.6 |
| | | | | | | *Cynodon nlemfuensis* | | | | | | |
| March | 1.90 | 6.4 | 0.86 | 8.5 | 22.0 | 195 | 8550 | 590 | 28 | 91.0 | 4.0 | 2.5 |
| April | 2.10 | 6.8 | 0.80 | 8.0 | 18.0 | 202 | 8320 | 560 | 28 | 88.5 | 3.8 | 2.5 |
| May | 2.17 | 7.5 | 0.83 | 5.8 | 19.2 | 208 | 8100 | 540 | 26 | 86.0 | 3.6 | 2.3 |

* Organic master

**Table 2. Energetic (Mcal kg DM$^{-1}$), bromatologic (%), morphologic (%) and productive (kg DM ha$^{-1}$) seasonal variation.**

| | Treatments | | |
|---|---|---|---|
| Mcal kg$^{-1}$ DM | Energetic characterization | | |
| | *Brachiaria brizantha* | *Cynodon nlemfuensis* | CV** |
| $NE_m$ | 1.17 [a] | 1.02 [b] | 1.82 |
| $NE_g$ | 0.548 [a] | 0.359 [b] | 5.20 |
| $NE_l$ | 1.02 [a] | 0.905 [b] | 2.50 |
| % | | | |
| TDN | 46.47 [a] | 41.82 [b] | 2.22 |
| % | Bromatologic characterization | | |
| CP | 8.03 [a] | 5.97 [b] | 2.02 |
| CC | 31.71 [a] | 25.92 [b] | 2.51 |
| NDF | 68.30 [b] | 74.07 [a] | 1.01 |
| ADF | 50.17 [b] | 54.35 [a] | 1.68 |
| Hemicellulose | 18.13 [b] | 19.73 [a] | 3.99 |
| | Morphologic characterization | | |
| Leaves | 28.00 [a] | 18.8 [b] | 29.0 |
| Green stalks | 48.20 [a] | 31.60 [b] | 23.0 |
| Dead material | 23.80 [a] | 49.60 [b] | 35.0 |
| | Dry matter production | | |
| Kg DM ha$^{-1}$ | 14.26 [a] | 9.72 [b] | 22.02 |

** Coefficient of variation

## Discussion

*B. brizantha* showed a better nutritive and energetic profile for cattle feeding in Sinaloa. Results coincide for Crude Protein (8.03%) with those found by Roche *et a*l. (1994) (7.8-8.2%) and Morais *et al*. (1998) (8%) in *Brachiaria*. On the contrary, *C. nlemfuensis* had a low value (5.97%) in comparison to that reported by Brown *et al*., (nd) (8.4%) and Lizárraga (1995) (16.9%). According to Burton *et al*. (1963), Crude Protein content varies from 8.4-18.5% in this grass. This low Crude Protein content in this last species could be in part because of the high and low percent of dead material and leaves, respectively; Minson (1990) and Morais *et a*l. (1998) mention that Crude Protein and Cell Content are higher in leaves than in green stalks and dead material, in that order. Guerra *et al*. (1999) concluded that *B. brizantha* grows well and rapidly even on low fertility soils. Besides, soil results might have affected results because organic matter and N were higher in the soil where this grass was growing.

## Conclusion

*B. brizantha* has a better nutritive and energetic characterization for cattle feeding in Sinaloa, Mexico.

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