ID: 14 Forage quality and methane production of the grazing portion of grass produced under elevated [CO_2]

A.L. Abdalla[1]; R. Ghini[2]; A.S. Natel[1]; A.L. Abdalla Filho[1]; H. Louvandini[1]; M.C. Piccolo[1]
[1] University of Sao Paulo, CENA, Piracicaba, SP – Brazil. [2] Embrapa Environment, Jaguariuna, SP, Brazil

Background: The potential changes in nutritional quality of forages for livestock production under climate changes scenario are still scarce, despite recent works have shown that the elevated [CO_2] increased biomass production, in grass lesser than in legume. This work aimed to determine the effects of season and enhanced [CO_2] under Free-Air Carbon Dioxide Enrichment (FACE) conditions upon biomass production and nutritional quality of the grazing portion of *Brachiaria decumbens*.

Methods: FACE was established in 12 rings, 6 of them being the control under untreated conditions (current atmosphere), whereas the others have been fumigated with pure CO_2 to achieve the concentration of 200 ppm above ambient. Two 0.25 m^2 plots have been established with *B. decumbens* and after standardization cut, forage production was harvested every 21 days for two years. Samples were collected from plots at 20 cm height, the grazing portion of the stand. Collected samples have been evaluated for determining the biomass production, nutrients and fibre quality and in vitro CH_4 production. Data was statistically analysed by GLM considering year, season, block and plot.

Results: Season and year had significant effect ($P < 0.01$) upon all the studied variables. Biomass production, acid detergent fibre and cellulose contents of samples from enhanced [CO_2] were statistically greater ($P < 0.05$) than control. Carbon to nitrogen ratio and crude protein content were within the normal range and these were not altered ($P > 0.05$) by enhanced [CO_2]. Ratio between fibres with slow and fast degradation showed that samples from fumigated rings had lower digestibility and *in vitro* organic matter degradability tended to be lower ($P = 0.09$) for the enhanced conditions. Methane production was high in all samples.

Conclusions: Elevated [CO_2] and rain season significantly affected forage production with reduction on its nutrients availability, challenging the methane intensity and sustainability of ruminant production in the tropics.