

# FLUXES OF GREEN HOUSE GASES (N<sub>2</sub>O, CO<sub>2</sub>, CH<sub>4</sub>) FROM A SUGARCANE CROP UNDER DIFFERENT SOIL MANAGERMENTS IN SÃO PAULO STATE, BRAZIL

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## Summary

Sugar cane in Brazil is expanding; and consequently there will be an increase in the use of N fertilizers and solid and liquid residues of the sugar cane industry used as soil amendments. This fact could potentially increase green house gases (GHG) emissions into the atmosphere, especially N<sub>2</sub>O. The lack of field measurements about emissions of GHG associated with sugar cane cultivation hinders our capacity to properly quantify such emissions. The objective of this study was to measure GHG emissions to the atmosphere from a plant cane experiment containing five different randomized treatments. Treatments are as follows: (T0) Control; (T1) N-P-K via mineral fertilizers (60 kg N ha<sup>-1</sup> yr<sup>-1</sup>); (T2) N via filter cake and P-K via mineral fertilizers (135 kg N ha<sup>-1</sup> yr<sup>-1</sup>); (T3) N-P via mineral fertilizers and K via vinasse (80 kg N ha<sup>-1</sup> yr<sup>-1</sup>); (T4) N-P-K via mineral fertilizers, filter cake and vinasse (220 kg N ha<sup>-1</sup> yr<sup>-1</sup>). Here we present the first five months of data. The highest CO<sub>2</sub> emission was observed in T4 (11.7 g C m<sup>-2</sup> day<sup>-1</sup>), followed by T3 (8.1 g C m<sup>-2</sup> day<sup>-1</sup>) and T2 (8.7 g C m<sup>-2</sup> day<sup>-1</sup>). The lowest CO<sub>2</sub> emissions were observed in T1 and control. It was observed CH<sub>4</sub> consumption, and only T4 presented emission (0.02 kg ha<sup>-1</sup> yr<sup>-1</sup>). The highest net emissions of N<sub>2</sub>O was observed in T4 (908 g.ha<sup>-1</sup>.y<sup>-1</sup>) followed by T2 and T3 that were half of T4. The N<sub>2</sub>O lowest emissions were observed in T1 and control. The emission factors (EF) for N<sub>2</sub>O were 1.12% (T1), 0.73% (T2), 1.26% (T3) and 0.81% (T4). The EFs estimated in our study are approximated to the factor proposed (1%) by the IPCC (2006). Our results suggest that the application of 60 to 140 kgN.ha<sup>-1</sup>.y<sup>-1</sup> via mineral fertilizers and vinasse enhance GHG emissions in plant cane.

**Key-words:** sugarcane, ethanol, greenhouse gases, vinasse, filter cake.

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