

II SIGEE – Second International Symposium on Greenhouse Gases in Agriculture – Proceedings



II Simpósio Internacional sobre Gases de Efeito Estufa na Agropecuária - II SIGEE -

*II International Symposium on Greenhouse
Gases in Agriculture*

Mitigation of nitrous oxide emission from cattle excreta in pasture with dicyandiamide (DCD)

Paola Cristina Iungblod DA LUZ¹, Priscila Luzia SIMON¹, Reinaldo Carlos BREVILIERI¹, Jeferson DIECKOW¹, Josiléia Acordi ZANATTA³.

¹ Universidade Federal do Paraná, Curitiba - PR, ² EMBRAPA-Florestas, Colombo - PR.

E-mail address of presenting author*: pahioungluz@gmail.com

Introduction

The agricultural activity is a major contributor to the emission of nitrous oxide (N₂O) and the adoption of management practices that minimize this emission is crucial. The Brazilian cattle herd is over 200 million heads and its excreta contribute to 41% of national N₂O emission. Thus the objective of this study was to evaluate the efficiency of dicyandiamide (DCD), a nitrification inhibitor at reducing the emission of N₂O and determining the best way of applying the inhibitor, if sprayed onto or mixed with urine and dairy manure.

Material and Methods

The study was conducted at the experimental farm of the Federal University of Parana, in Pinhais-PR, from January to October 2014 in three seasons representing the Summer, Autumn and Winter. The treatments were: soil without excreta and without DCD (control group); application of urine (U), urine mixed with DCD (U + DM) and urine sprayed with DCD (U + DP); application of dung (D); dung mixed with DCD (D + DM) and dung sprayed with DCD (D + DP). The experimental design was a randomized block design with four replications. Metal collars of 0.083 m² were inserted into the soil and served to delimit the treatment spots and to support the gas collecting chamber (static chamber method). Air samples were analyzed by gas chromatography.

Results and Conclusions

The use of DCD mixed with urine reduced N₂O emissions by 79 and 55% in autumn and winter, respectively. When sprayed, DCD was efficient only in autumn, with a reduction of 45% of emission. In Summer, the use of DCD was not efficient to reduce emissions. In autumn, there was no significant difference in the forms of application of DCD, being both efficient in reducing emissions. For dung, DCD was significantly efficient only in winter, and when applied in mixed form, which may be related to the originally low N₂O emission in this type of excreta.

References

IBGE - Instituto Brasileiro de Geografia e Estatística. **Censo Agropecuário**. Rio de Janeiro, 2010.

DE KLEIN, C.A.M. & LEDGARD, S.F. Nitrous oxide emissions from New Zealand agriculture key sources and mitigation strategies. **Nutrient Cycling in Agroecosystems**. 2005; 72: 77-85.