EFFECT OF A NITRIFICATION INHIBITOR ON NITROUS OXIDE AND AMMONIA EMISSIONS FROM A MAIZE CROP

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INTRODUCTION

Nitrogen fertilizer is essential for the high rate of food production delivered by modern agriculture (Kang N et al. 2014). The application of organic and inorganic fertilizers to soil can result in increased gaseous emissions, such as NH3, N2O, CO2, and CH4 as well as nitrate leaching. Besides, maize cropping has a high potential to generate large N losses due to its water and nitrogen demand.

• Volatilization of ammonia (NH3) from fertilized agricultural fields to the atmosphere causes adverse human health and environmental effects and supposes an increase in economic cost (Nelson et al. 2017).
• Nitrous oxide (N2O) is a harmful greenhouse gas (GHG) which is mainly produced through the soil microbial processes of nitrification and denitrification (Guardia et al. 2017).
• The use of Nitrification inhibitors (NIs) has been shown to effectively decrease nitrogen losses from the soil-plant system (Florio et al. 2016).

OBJECTIVES

The principal objectives of this study were to assess the inhibitory effect of 3,4-dimethylpyrazole phosphate (DMPP) (Zerulla et al., 2001) on N2O emissions and NH3 volatilization on an irrigated maize crop (Zea Mays), under Mediterranean conditions, fertilized with pig slurry (PS) and Calcium ammonium nitrate (CAN) in split application, adjusted to provide 200 kg N ha⁻¹.

MATERIALS & METHODS

Field Station: “La Chimenea”, located in the central Tajo river basin near Aranjuez (Madrid, Spain).
Crop: Irrigated Zea mays crop period was from 20th April 2015 to 23rd September 2015.
Climate conditions: Average temperature for this period was 21.3 °C and 100 mm rainfall: 2 treatments + 2 repetitions: 1600 m² per plot

Nitrogen management techniques:
• Integrated Horizontal Flux (IHF) (Denmead et al. 1977) and
• backward Lagrangian Stochastic Model (bLS) (Flesh et al., 2005).

RESULTS

N2O was sampled during maize crop period by using opaque manual circular static chambers and measured by gas chromatography

REFERENCES


The authors are grateful to the Spanish Ministry of Economy and Innovation and the Community of Madrid for their economic support through Projects AGL2015-69540-C3-2-J, the Agronomic CTM2015-64687-R and EU-Fehmarn. We also thank the technicians and researchers at the Department of Chemistry and Agricultural Analysis of the Agronomic Faculty (Technische University of Madrid, UPM).