

Effects of the use of biochar in soil nitrous oxide emissions

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Introduction

It is estimated that 80% of nitrous oxide (N₂O) emissions caused by human actions are from agriculture [1].

The global warming potential of N₂O is about 296 times that of CO₂, considering a period of 100 years [2].

This study was carried out to evaluate the biochar application effects in N₂O soil emissions.

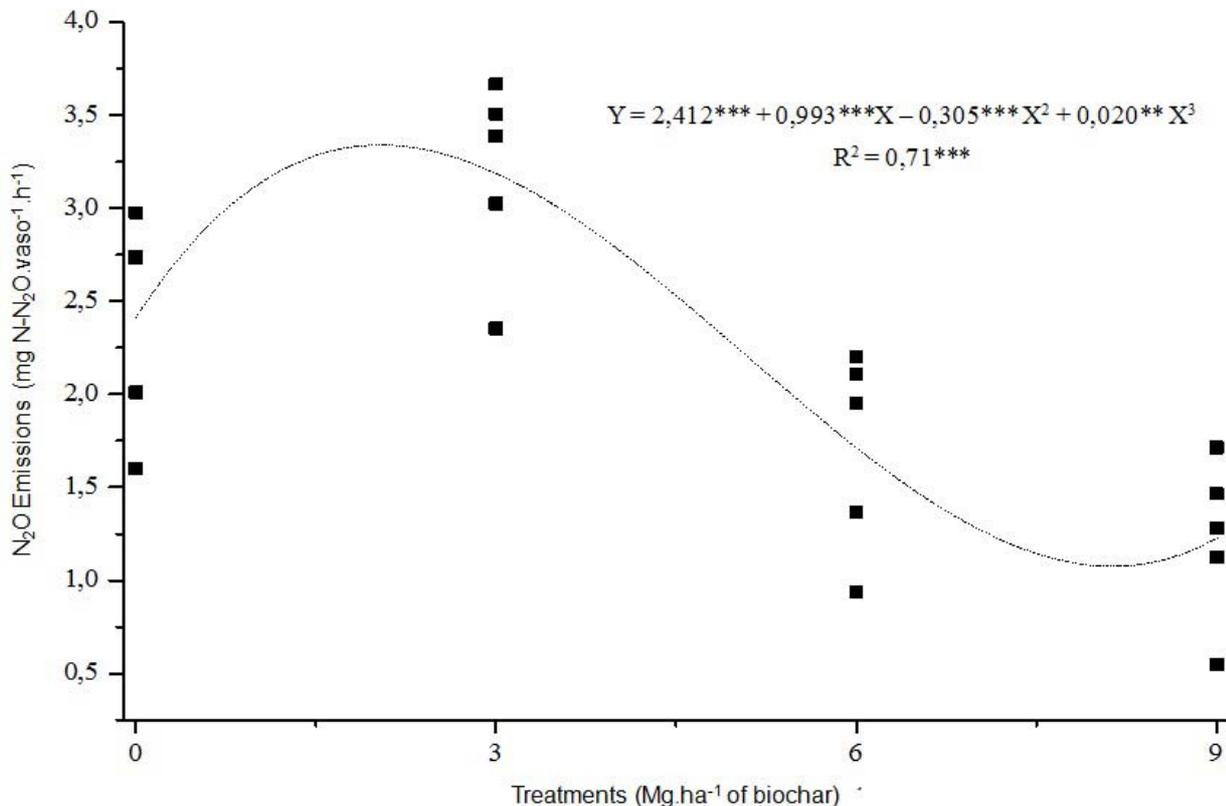
For this experiment, soil samples from Planossolo Háplico, commercial powdered charcoal, as biochar and urea, as the nitrogen source (100 Kg of N.ha⁻¹), were used. Four treatments were performed: zero (Control), 3, 6 and 9 Mg.ha⁻¹ of biochar.

Results and Discussions

From the data analysis, there was a significant difference between treatments and the cubic regression was significant.

The treatments with 6 Mg.ha⁻¹ and 9 Mg.ha⁻¹ equivalents showed a mitigating effect on the N₂O soil emissions, with values 29 and 49% lower than control, respectively.

Treatment with a 3 Mg.ha⁻¹ dose equivalent had an increase of 32% in emissions (Figure 1), indicating a possible positive effect on the factors that stimulate denitrification, such as increasing water retention, which implies a condition that increases the denitrification process.



** Significant at 1%, *** Significant at 0.1%

Figure 1. N₂O soil emissions found for the different treatments.

Conclusions

The use of biochar may be a potential alternative to mitigate N₂O soil emissions.

By analyzing the regression equation obtained, this study indicates that with doses above about 5 Mg.ha⁻¹ of biochar, the mitigating effect of N₂O soil emissions is obtained under the tested conditions.

Acknowledgements

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