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Book of abstracts

GT 07 - 161 - P

IMPACT OF TORREFIED RAPESEED STRAW APPLICATION ON EARTHWORMS GROWTH AND AVOIDANCE/PREFERENCE BEHAVIOUR.

GT 07. SOIL AMENDMENTS & FERTILIZERS / GT 09. SOIL HEALTH

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There is growing interest in torrefied biomass (biotorr) as a soil amendment [1], but unlike biochar, its effects on soil functioning are poorly documented. In particular, although biotorr is expected to affect soil properties in a similar way to biochar [2], there is a significant knowledge gap regarding its effects on soil fauna, particularly earthworms. Here, we conducted ecotoxicological and avoidance/preference tests on two earthworm species to determine how rapeseed straw biotorr produced at two temperatures affect earthworm survival, growth and behavioral responses compared to fresh straw and biochar produced at 400°C. Additionally, we included pre-washed variants of each treatment to evaluate if the potential toxicity of biotorr to earthworms could be related to the solutes removed by the pre-wash. Our results showed no impact of amendment application on earthworm survival rate. However, we noted significant differences concerning the amendment effects on earthworm growth. Earthworms were biggest in treatments with application of 230°C biotorr and fresh straw compared to 280°C biotorr and control treatments. Biotorr application did not induce earthworm avoidance. In addition, we observed earthworm preference for fresh straw compared to unwashed 280°C biotorr and 400°C biochar. Pre-washing significantly increased biotorr attractiveness for earthworms compared to fresh straw, but had no impact on biochar, suggesting that biotorr contains soluble compounds affecting soil fauna. We conclude that soil amendment with prewashed biotorr may be more suitable than biochar and fresh residues to foster earthworms.

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GT 07 - 177 - P

VALORIZING BIOCHAR AS A FERTILIZER IN MEDITERRANEAN AGRICULTURE: EFFECTS ON SOIL FERTILITY, NITROGEN DYNAMICS, AND SOIL GREENHOUSE GAS EMISSIONS

GT 07. SOIL AMENDMENTS & FERTILIZERS / GT 10. SOIL CARBON DYNAMICS AND STABILIZATION

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Biochar is increasingly considered a promising amendment to improve soil fertility and reduce the environmental impacts of agriculture. This is particularly relevant in Mediterranean semiarid regions, where soils often suffer from low organic matter, limited nutrient retention, and high risk of degradation under intensive cropping systems. To explore its agronomic potential, a field experiment was established at the research farm of the Aula Dei Experimental Station (EEAD-CSIC, Zaragoza, Spain) over two wheat-growing seasons (2025–2026). The soil is a Typic Xerofluvent with silty loam texture, basic pH, low carbon and nitrogen contents, and more than 30% $CaCO_3$. The experiment consists of six treatments: control (C), mineral fertilizer only (MF), low biochar (2 t/ha, LB), medium biochar (6 t/ha, MB), and combinations LB+MF and MB+MF.

Soil nitrogen dynamics showed that MF and LB+MF treatments led to the most pronounced increases in nitrate availability, over 3 to 4 times higher than the control, indicating greater risk of leaching. Biochar-only treatments displayed more stable N profiles with lower peaks, suggesting better retention. In terms of soil greenhouse gas emissions, the MF treatment increased both CO_2 and N_2O emissions compared to the control. In contrast, the combination of medium-dose biochar with fertilizer reduced cumulative N_2O emissions by over 140% relative to MF alone, while moderating CO_2 release. These preliminary outcomes suggest that moderate biochar doses combined with mineral fertilizer may support more sustainable nitrogen management in calcareous Mediterranean soils.