

Impact of soil incorporation of biochar on radon emission



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P A S



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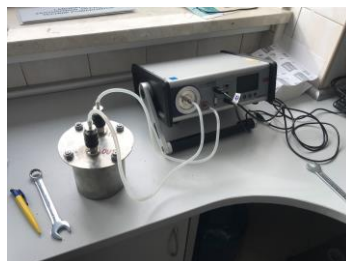
INTRODUCTION

Biochar (charcoal made from biomass in the pyrolysis process) has found broad application in agriculture. It helps to improve both the physical and chemical properties of soil through decontamination of heavy metals and pesticides. This work examines the potential for biochar application to improve the radiological condition of soil. In addition, we directly measured radon emission rate at the experimental fields with various doses of biochar (in 1–100 Mg ha⁻¹). The analyses were performed using an active method for radon emission using an AlphaGUARD instrument equipped with an accumulation box. The radon emission rate increased by 6 mBq m⁻² s⁻¹, on average, depending on the biochar dose (from 1 to 100 Mg ha⁻¹).

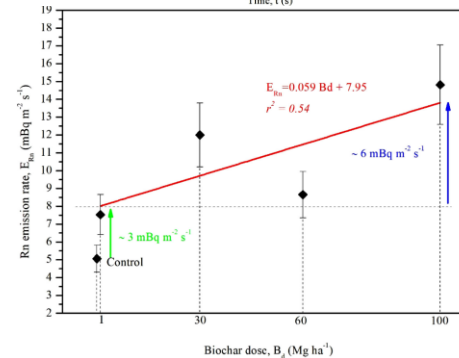
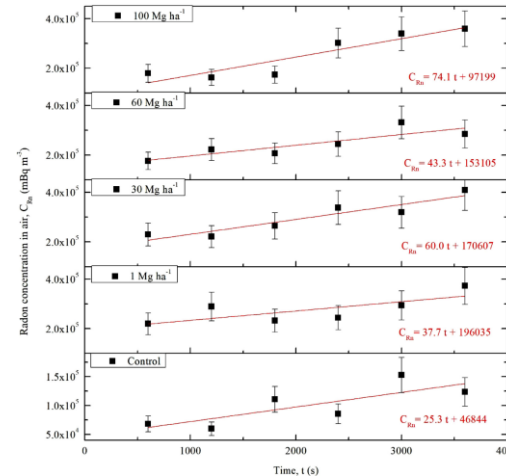
METHODS

Radon emission (ERn) was measured using the active method based on the AlphaGUARD (produced by Saphymo Company) instrument equipped with an accumulation chamber with a 0.024 m³ volume and 0.12 m² accumulating area.

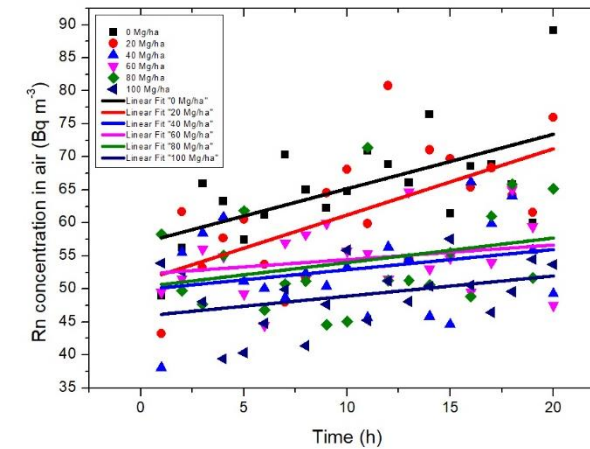
The radon emanation coefficient were assessed using active cumulative technique incorporating AlphaGUARD instrument equipped with sealed accumulation box.



RESULTS



Radon concentration in air registered for five experimental plots by the AlphaGUARD instrument equipped with an accumulation box (upper graph) and dependence of the radon emission rate on biochar dose (described in the figure as B_d) applied to the soil (lower graph)



Radon concentration in air emanated from soil samples and assessed in sealed accumulation box.

CONCLUSIONS

- The measurable influence of biochar was observed in direct field radon emission measurements.
- For activity concentration, the only measurable effect was associated with a decrease in soil bulk density after biochar application.
- The reduction of radon emanation with increasing biochar dose applied into the soil was observed.
- The observed results may testify to the possibilities of use of biochar as a material for reduction of radon emission from the soil after soil bulk density stabilization after biochar application.