The effect of biochar on the intensity of soil respiration: model experiment

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The aim of the work was to estimate the duration of pre-incubation of soil : biochar model mixtures (in a ratio of 20: 1) on the intensity of basal respiration (BR) and substrate-induced respiration (SIR) of soils. For the experiment we used 10 biochar samples prepared from various wood and herbaceous residues in different slow pyrolysis regimes at temperatures below 400°C and in the interval 490-590°C. At different stages of incubation there is a positive and negative effect of biochar on the SIR and BR in comparison with the control. In the early stages of the model experiment (3 days) the biochar effect on the soil respiration is multidirectional, during the incubation for 3 and 6 months the effect on the SIR and BR becomes positive. For all variants of the incubation experiment during 6 months there is the general tendency to reduce the intensity of BR compared to the control. At short-term incubation were obtained 3 statistically significant regression coefficients which show the effect of the biochar properties on the value of the SIR: the content of medium-oxidizable fraction of organic matter (b_1=0,317), the water pH (b_2=0,536) and sodium content in acetate extract (b_3=-0,15). When incubated for 3 months only the content of the medium-oxidizable fraction of organic matter (b_1=0.277) significantly affects the intensity of SIR, when incubated for 6 months - the ash content (b_1=0,062).

Key words: Biochar, soil respiration, model experiment, basal respiration, substrate-induced respiration.

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