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PLANT BIOMASS CHANGES AFTER ADDITION OF BIOCHAR, INOCULUMS AND NITROGEN FERTILIZERS

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Biochar addition to agricultural soils is considered as a promising strategy for climate change mitigation by carbon sequestration. Moreover, biochar is characterized as a special kind of soil organic matter (SOM) stabilized by its pyrogenetic origin against microbial decomposition. Extraordinary long persistence of biochar in the soil is of a great importance due to the low SOM amount prevailing in arable soils of Middle Europe as a consequence of intensive agricultural practices and overdoses of mineral fertilizers. However, some uncertainness remains concerning the biochar's influence on the soil properties. Simultaneous application of biochar and bacterial inoculums seems to be a promising way to increase the positive effect of both additives. This research is focused on the changes of nitrogen (N), carbon (C) and phosphorous (P) contents in plant aboveground dry biomass after the addition of beech wood biochar (produced at slow pyrolysis using the temperature 470°C) as a soil amendment combined with simultaneous addition of two types of plant growth promoting bacteria (PGPB) inoculums and nitrogen fertilizer (DAM). Two consequent generations of experimental plant *Lactuca sativa L.* have been planted into square pots 100 cm^2 filled with the arable soil from the Brezova nad Svitavou protection zone of water sources (South Moravia, Czech Republic). Investigation has been conducted in the phytotron that was set to maintain ambient environmental conditions. The second generation of experimental plants has been cultivated in order to avoid misinterpretation caused by inappropriate interaction of the lettuce roots with the fresh biochar in soil. Thereat, remains preferable discussing mainly the observations obtained from the second plant generation. In general, solely application of microbial inoculum *Novaferm* improved biomass production (carbon allocation), nitrogen and phosphorous content in plant tissues. Simultaneous application of both additives (*Novaferm* + DAM /*Bactofil* + DAM) improved significantly the production of experimental plants and at the same time inoculums and nitrogen fertilizer improved the content of N in plant tissues. Moreover, only solely application of *Novaferm* increased the amount of P in 4 times compared to the first generation. Hence, this could be an explanation of high plant biomass obtained in comparison with the application of *Bactofil* in the first generation. In addition, simultaneous application of inoculums and N fertilizer stabilize the availability of P in the second generation. The decrease of P content and an increase of total C amount have been observed in the second generation of plant aboveground dry biomass in the amended with biochar and fertilizers treatments.