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# Development of fugal strains in biochar amended soils

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The application of carbonized materials (including biochar and hydrochar) produced by the pyrolysis of biomass to soil has been proposed as a novel approach to establish a significant long-term sink for atmospheric carbon dioxide in terrestrial ecosystems [1]. In addition, several research studies pointed out that biochar can act as a soil conditioner enhancing plant growth by supplying and, more importantly, retaining nutrients, and by providing other benefits such as improving soil physical and biological properties [2]. Despite numerous authors take for granted that microbial degradation of carbonized materials is highly unlikely, this fact is far away from being true for all the chars. Nevertheless, the knowledge concerning the natural degradation of chars by microorganisms is of high interest due to the direct decline on the char capacity for C stabilization. In order to achieve this goal, biochars from different feedstock and pyrolysis conditions were applied to soil from a Calcareous Cambisol (0, 2.5 and 5%) which was filled into 30-cm long methacrylate columns. They were incubated during 4 months under controlled conditions (25 ºC, 12 hours of light per day and water holding capacity maintained at 60% by adding deionized sterile water).

After 1 month of incubation, white colonies were observed on a biochar derived from paper-sludge. The microorganisms were cultured from paper sludge biochar, isolated and further identified by DNA-based molecular analysis [3]. The identified fungi grouped into the *Fusarium* genus within Ascomycota phylum, being represented by *F. oxysporum*. These fungi are soil-borne and have the ability to exist as saprophytes. *F. oxysporum* strains are known to degrade lignin and complex carbohydrates associated with soil debris [4]. However, many strains within the *F. oxysporum* are pathogenic to plants, especially in agricultural settings. *Fusarium oxysporum* f. sp. *Cucumerinum* is responsible for vascular wilt in cucumber plants [5]. These results are of significant interest for agriculture and demands microbiological tests prior to using biochar for increasing the carbon sequestration potential of soils or for agronomic purposes, since C stabilization and soil biological properties may be affected by specific biochars.

References:

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