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Interactive comment on "Two different microbial communities did not cause differences in occlusion of particulate organic matter in a sandy agricultural soil" *by* Frederick Büks et al.

Anonymous Referee #2

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In the draft untitled "Two different microbial communities did not cause differences in occlusion of particulate organic matter in a sandy agricultural soil", the authors compared the occlusion in aggregates of newly added pyrochar particles in the presence of two differing microbial communities. The experiment was conducted in laboratory conditions using a sandy soil. The draft is clear but I have several strong concerns about the methodology and the rationale of this work.

It remains unclear whether the diversity of microbial communities plays on soil organic matter decomposition (for instance Griffiths et al., 2000; Wertz et al., 2006). To this respect, it seems very unlikely that the diversity of microbial communities can play significantly on soil organic matter occlusion which affects SOM decomposition. The

result of the draft is therefore not surprising.

If we consider that microbial communities can play on the amount of occluded POM, the authors made unappropriated experimental choices if they want to see it. First, as mentioned in the discussion part, occlusion is likely not an important stabilization mechanism in sandy soils. As a result, I can't understand why this study was conducted on a sandy soil and not on a clayed or loamy soil. Second, before playing on SOM occlusion, microbial communities should have influenced soil structure. To my opinion, the first logical step would have been to check whether aggregate-size distributions were different between the two treatments. Third, it has been established that the degradation of fresh particulate organic matter is important for macroaggregate and microaggregate formations (for instance Six et al., 2000). To this respect, the choice of the poorly degradable pyrochar is particularly inappropriate. Indeed, pyrochar is likely a poor C source for microbial activity and the production of microbial-derived binding agents.

In summary, even if it is worth reporting negative results, I consider that this negative result is too obvious to be of interest for SOIL readership.

References: Griffiths et al. (2000) cosystem response of pasture soil communities to fumigation-induced microbial diversity reductions: an examination of the biodiversity–ecosystem function relationship. Oikos 90:279-294.

Six et al. (2000) Soil macroaggregate turnover and microaggregate formation: a mechanism for C sequestration under no-tillage agriculture. Soil Biology and Biochemistry, 32:2099-2103.

Wertz et al. (2006) Maintenance of soil functioning following erosion of microbial diversity. Environmental Microbiology, 8:2162-2169.

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