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Interactive comment on "Obtaining more benefits from crop residues as soil amendments by application as chemically heterogeneous mixtures" *by* Marijke Struijk et al.

Flavia Pinzari (Referee)

f.pinzari@nhm.ac.uk

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Transferring knowledge on the decomposition of forest litter to the agricultural sector, to improve organic inputs to the soil by burying plant residues, is certainly an exciting and worthwhile approach. This study is very accurate, scientifically sound and is carried out with great care. The manuscript is well written, and the introduction is very exhaustive. A few comments and some suggestions that could help to improve the clarity of some parts are provided.

Introduction The authors well referred to the mechanisms that contribute to the synergistic and not merely additive effects of a mixture of residues. It would be use-

ful to have here a mention of the role of the diversity of decomposers and their niches, and what emerged in studies on forest systems regarding the composition of communities in homogeneous systems compared to mixed systems, not limiting the scenario as purely a matter of microbial carbon use efficiency. The article https://doi.org/10.1111/mec.13739 and other (some quoted therein) give some useful perspectives on dynamics (and complex succession) of bacteria and fungi during decomposition.

Materials and methods The authors limited the analysis of chemical elements to K, P and Mg, besides C and N. The decomposition of organic residues is also linked to other elements that play an essential role in some enzymatic activities fundamental in oxidative processes (manganese, copper and iron, for example). I find this being a bit of a limit of the work that indeed found some significant correlations, reported in the last table and only marginally commented. The introduction of specific residues may have had an impact on the availability of certain microelements capable of explaining the course of some processes.

Results Lines 240-45: "Contrary to our hypothesis, there was a non-additive increase in pH from the mixtures relative to individual amendments (hypothesis 1)". Why should pH increase more in a synergic scenario? How would the authors link pH dynamics with decomposition and the quality of starting materials? This part needs clarifications.

Correlations 3.3- This part would deserve more space. Although it is true that the effect of the synergy of the use of diversified starting materials can be well seen on the quantitative data, I believe that correlations between the amount of nutrients applied and the amount of available K and Mg in the soils are extremely significant. I would be curious to see if the values of R and its sign (+/-) changes when calculated between respiration or SOM and K, Mg, P within each treatment, or between the two main kinds of treatments (mixed or not).

Discussion The different organic residues may have contributed groups of mi-

croorganisms capable of directing the decomposition process. The effect of the founder is a process that has a certain weight in the phenomena of ecological succession, especially in the case of microorganisms (see, for example, this work: http://dx.doi.org/10.1016/j.pedobi.2017.01.004). The manuscript under revision is very articulated and definitely not focused on the more strictly microbiological aspects, but a mention of the possible role of the microbial charge of the source material is necessary for the discussion of the results.

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