

## ***Interactive comment on “Effects of Spent Mushroom Compost on Physicochemical Properties of Degraded Soil” by İlknur Gümüş and Cevdet Şeker***

**Anonymous Referee #4**

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### General comment

This paper discusses about the improvements in some physical and chemical properties of degraded soils using spent mushroom compost. The results suggested that the considered organic matter supplements increased the aggregate stability, organic carbon, total nitrogen, however decreased the modulus of rupture.

There are several questions and recommendations I came across when I review the manuscript that are listed below:

In my opinion the manuscript consists several weak sections. Particularly, introduction, methodology, discussion and conclusion sections are really poor and short.

C1

Based on the information given in the Introduction, it is understood that this work was built on the soil quality parameters. Although there are a lot of soil quality parameters such as mean weight diameter, water retention capacity, infiltration rate, hydraulic conductivity etc, it is not understood why the modulus of rupture was used. This parameter is very specific and it is generally used to investigate the crusting that effects on emergence of seedling. Thus, the modulus rupture has not encountered in studies investigated soil quality. The reason of using of this parameter should be explained in the introduction section.

In addition, to better understand the effects of the applied material on soil properties, the differences between the applied incubation times should be analyzed.

The graph captions should be clarified. The “F” and “LSD” values should be given in all graphs showing the results of the ANOVA.

I am not a native English speaker but I found many mistakes in English, thus I recommend that a native speaker must revise the manuscript before submission.

### Specific details

#### Abstract

In the abstract (Page 1; line 17) it was written that “soil samples were incubated at field capacity”, but this information seems different from the info given in the material and methods section as (Page 5; Lines 95-96) “During the incubation period, the soil moisture level in the pots was maintained at 50-75% of field capacity”.

Page 1; Lines 21-23: “The results obtained from this study clearly indicated that the application of spent mushroom compost reduces the modulus of rupture..”. I think this conclusion is not correct because in Fig 2, the trend shows variation on the modulus of rupture after 62 days of incubation time. Please rewrite this sentence. Where can I use SMC to restoration of degraded soils? For example, may this organic material be used in degraded soils located in arid and semiarid climatic condition? This information

C2

should be given in abstract.

#### Introduction

In this section information of soil quality was given. But, identification of degradation, degradation types, the effects of organic amendment especially SMC on soil properties were not mentioned. As we know there are a lot of studies focused on the effects of organic matter on soil physical and chemical properties, thus authors should include the following studies as literature in the introduction section:

Alagöz Z, Yilmaz E. 2009. Effects of different sources of organic matter on soil aggregate formation and stability: A laboratory study on a Lithic Rhodoxeralf from Turkey. *Soil Till Res.* 103:419-424.

Annabi M, Le Bissonnais Y, Le Villio-Poitrenaud M, Houot S. 2011. Improvement of soil aggregate stability by repeated applications of organic amendments to a cultivated silty loam soil. *Agr Ecosyst Environ.* 144:382-389.

Ozdemir N, Uzun S, Yakupoglu T. 2007. The effect of the rates of different organic fertilizers on restoring aggregate stability and productivity of eroded soils. *Biol Agric Hortic.* 25:175-184.

Turgut B, Kose B. 2016. Improvements in aggregate stability of sediments supplemented with tea waste and farmyard manure. *Spanish Journal of Soil Science.* 6(2):98-106.

Yakupoglu T, Ozdemir N. 2012. Influence of some organic amendment materials on total porosity of an eroded soil. *Arch Acker Pfl Boden.* 58:195-200.

Zhang L, Sun X. 2014. Changes in physical, chemical, and microbiological properties during the two-stage co-composting of green waste with spent mushroom compost and biochar. *Bioresource Technology.* 171:274-284.

#### Material and Methods

C3

The map showing the location of the sampling area is missing.

Table 1 and Table 2 were not referred in the text.

There is no need to give the size of soil fractions in Table 1.

How the organic material was added to the soil samples is not clear. Was it mixed into the soil samples or just placed on the surface of the soil samples?

The formula of modulus rupture is missing.

#### Results and Discussion

The effects of SMC on aggregate stability were not discussed with literature.

The reason of the decrease trend of aggregate stability due to incubation times is not satisfactory. In similar studies, researchers reported that the aggregate stability tended to rise in approximately 4 weeks and then decreased with elapsed times, mostly associated with the effectiveness time of organic material used and they did not reported that the aggregate stability decreased below the initial value (Abiven, S., Menasseri, S., and Chenu, C.: The effects of organic inputs over time on soil aggregate stability—A literature analysis, *Soil Biology and Biochemistry*, 41, 1-12, doi:10.1016/j.soilbio.2008.09.015, 2009; Turgut B, Kose B. 2016. Improvements in aggregate stability of sediments supplemented with tea waste and farmyard manure. *Spanish Journal of Soil Science.* 6(2):98-106). However, the decreasing in aggregate stability in your research may be caused by the use of a mechanical stirrer to mix soil samples because this process can damage the aggregate and it may influence the study results.

The reason of increase in modulus of rupture at 62 day incubation time was not well explained. The same sentence was used in the study of Şeker (2003) for explaining this reason; "This most probably resulted from the breakdown of soil aggregates and the decomposition of soil organic matter due to the mixing of the pots' contents to simulate repeated cultivation". This method has to be given in material and methods

C4

section. But, mixing of the samples with a mechanical stirrer to simulate soil tillage is not suitable for this kind of works. In studies considered the incubation period and application dozes, the applications may affect the aggregation should be avoided and I could not find similar results in the references given (Carrizo et al., 2015).

May the increase of EC values of treatment depend on EC value of applied organic material?

In my opinion, these are really critical points that lack the entire work as it is. Thus, the paper in its present form is unfortunately not ready for publication. Please consider all these comments to improve the manuscript and submit again as a new manuscript.

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