SOIL Discuss., 2, C156–C159, 2015
www.soil-discuss.net/2/C156/2015/

SOIL Discussions Open Access

Interactive comment on "Ecological sanitation products reuse for agriculture in Sahel: effects on soil properties" *by* D. Sangare et al.

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Received and published: 14 May 2015

We are grateful for the Anonymous Referee #2 comments, which we have taken into account in reviewing our manuscript.

Anonymous Referee #2 comments

1. The tittle is not real because the paper only showed the effect on TOC and EC.

The Anonymous Referee #2 is right, but in this work, we wanted to focus on the soil salinity (Electrical conductivity), sodicity or sodization (Sodium Adsorption Ratio) and TOC. These phenomena are particularly important in arid and semi-arid regions characterized by low rainfall, high evaporation, and low salt leaching from the topsoil. We

limited our study to these parameters. We propose the new title: Ecological sanitation products reuse for agriculture in the Sahel: effects on soil salinity and sodicity.

Introduction

1. Page 2, line 25: "We provide the reference Food insecurity is partially explained by declining soil fertility, higher chemical fertilizer prices on the global market, and water scarcity, especially in the Sahelian region. The Anonymous Referee #2 is right, we provide this reference: Bationo et al.,2014,who describe sahelian soils.

Bationo, A., Kihara, J., Waswa, B., Ouattara, B., Vanlauwe, B. 2014. Technologies for sustainable management of sandy Sahelian soils. In: Management of Tropical Sandy soils for sustainable agriculture. A holistic approach for sustainable development of problem soils in the tropics. FAO Regional Office for Asia and the Pacific. Bangkok. pp. 414-429.

Material and Methods

1. The design of the experiment is clear, but in my opinion, the authors have to rewrite part of this apart because tables 1, 2 and 3 must be included here in MM, these data are the main characteristic of the material used for the experiment. Please rename the tables according with the citation in the text. We thank the Anonymous Referee #2 for this suggestion. We are surprised by this remark. Indeed, in the initial version of the manuscript, table 3 was in Material and Methods section. The tables included the data of material used for our experiment, thus these tables must be included in Materials and Methods section. We think that these tables must be separated for good comprehension for the audience. On the other hand, Table 1 shows the salt amount provide from each material (urine, compost and greywater) during the experiment, this is a big issue in our study. We think that it would be difficult and less readable to group these data together in one table.

2. The authors have not provided any data about the heavy metals content in the re-

fuses why? Please include an explanation. The aims of the study was done is to understand soil salinity and sodicity after reuse ecological sanitation products. We focused on the case electrical conductivity (EC), sodium (Na+), Calcium (Ca2+), Magnesium (Mg2+) in ecological sanitation products. These elements could increased irrigated soil salinity and sodicity. It is right that heavy metal are problems for agriculture, but salinity and sodicity are main problems come from to ecological sanitation products.

3. "The bacterial load results showed that urine and compost can be used. . .." Please indicate under what regulation? The faecal coliforms count in urine and compost averaged 5.12 log10CFU 100mL-1 (2.37 $\times$ 106 CFU 100mL-1) and 4.40 log10CFU gDW-1 (2.03 $\times$ 106 CFU 100 gDW-1) respectively, and did not meet current standards which are inferior to 103 CFU 100 mL$-$1 or 103 CFU 100 gDW-1) for unrestricted irrigation, according to WHO (2006). However, for restricted irrigation, urine and compost can be used to fertilize cooking vegetables like Okra and also cereal crops, industrial crops, fodder crops, pasture and trees.

Results and Discussion

4. Page 13, the end of paragraph 20: "At the same time:" please review and cite other works as "Garcia-Orenes et al., 2005" . The reference "Garcia-Orenes et al., 2005" is in good agreement with the findings of improve structure in degraded soils. We thank the referee and we cited this reference in our work. García-Orenes, F., Guerrero, C., Mataix-Solera, J., Navarro-Pedreño, J., Gómez, I., and Matax-Beneyto, J.: Factors controlling the aggregate stability and bulk density in two different degraded soils amended with biosolids. Soil Tillage Res. 82, 65-76, doi:10.1016/j.still.2004.06.004, 2005.

5. In the follow paragraph the authors cited other works that showed that compost application improve soil biomass, but they do not study this parameter; in my opinion the results about soil have to be improve, providing new data about the evolution in the soil of: Cbimass, N, P, K, Na. We did not characterize N, P or K, because these parameters are not directly related to soil salinity or sodicity. To characterize soil salinity and sod-

icity, we used electrical conductivity (EC), and Sodium Adsorption Ratio (SAR). On the other hand, we characterized total organic carbon (TOC) before and after cultivation.

6. Also should be very interesting to study the survival of coliform bacteria and E. Coli in the soil after UTC application. We agree with the referee, it is important to evaluate the survival bacteria in the soil after UTC application, but we will monitor these parameters in the next study.

7. The results have showed that there are not significant references in TOC in soil between TGW and TGW+UTC treatments, but the compost has 80% of TOC, how do you explain this result? Please provide a supported explanation.

The Referee is right, this result was not discussed. Our experiment lasted for a short time (March to June), thus the compost have not enough time to decompose and release completely organic matter in soil after application. It should be long term compost application (many years) to observe a positive effect on agricultural soil organic carbon.

We added the following sentence: Eshetu et al. (2012) reported that the long-term compost application after 19 and 34 years was shown a positive effect on the organic carbon sequestration in agricultural soils.

Eshetu, B., Jandl G., and Leinweber, P.,: compost changed soil organic matter molecular composition: A Py-GC/MS and Py-FIM study. Compost Science & Utilization, 20, 230-238, DOI: 10.1080/1065657X.2012.10737053, 2012.

Modifications are highlighted in yellow color in the manuscript in supplement pdf.

Please also note the supplement to this comment:
http://www.soil-discuss.net/2/C156/2015/soild-2-C156-2015-supplement.pdf

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Interactive comment on SOIL Discuss., 2, 291, 2015.