

## ***Interactive comment on “Linking dissolved organic matter composition to metal bioavailability in agricultural soils: effect of anionic surfactants” by M. C. Hernandez-Soriano and J. C. Jimenez-Lopez***

**Anonymous Referee #2**

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### General comments

This paper is about the bioavailability of metals in soil. The bioavailability of Cd, Cu, Pb and Zn in three agricultural soils was essayed by the effect of greywater enriched in anionic surfactants (Aerosol 22 and Biopower) at field capacity and saturation regimes. The paper address relevant scientific questions within the scope of BG, but substantial conclusions are not yet reached.

The scientific experimental design (see below) and assumption are not valid or clearly outlined and therefore, the results are not sufficient to support the interpretations and  
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conclusions. Furthermore I am fully agree with Dr. Mostofa, in the sense that the authors give scarce credit to work and concepts related with the terminology.

This study presents serious methodological problems similar to those raised by the Anonymous Referee #1, but I'm not convinced that you can improve the statistical results by increasing the number of replicates ( $N > 2$ ). Replicate a finding, it can reach the conclusion independently, because the variability associated can be estimated. By contrast, duplicate a finding, you cannot reach a conclusion independently, as they have reproduced the experimental conditions from the same portion of soil. This means that you do not have truly replicates or pseudo-replicates.

You sampled three soil and made two portions (duplicates) from each and these sub-samples were used as replicates. I understand that many widespread type of experimental design in soil chemistry involves a single replicate per treatment which is neither surprising nor wrong. Indeed, replication is often unable to be realized when very large-scale experimental unit are studied. A one replicates may be the only or best choice when gross effects of a treatment is expected, or when the cost of replication is very large. What is liable to objection is that your conclusions originate from unreplicated treatments justified by erroneous application of inferential statistics (ANOVA test). So, even when you have pseudo-replicates, you must justify your treatments, i.e., the contaminated water irrigation impact on metal speciation from the same soil sampled from two or more independent sites belonging to the same area (soil series).

Specific comments M&M Soil description is very weak and it requires many inputs. There is no information of the soils origin and how they were sampled. Are the soils composed samples?

Page 4, 20-25. You should describe the soil type. What kind of agriculture was practiced in these contaminated soils? Page 5, 8-10. What do you mean by organic matter in soil solution in Table 1? Is it Dissolved Organic Matter? How did you extracted it? What is the difference between DOC from pore water extraction described on Page 6

and dissolved organic matter?

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