Solid Earth

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Discussions

Interactive comment on "Nitrogen, phosphorus, potassium, calcium and magnesium release from two compressed fertilizers: column experiments" *by* M. J. Fernández-Sanjurjo et al.

Anonymous Referee #2

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This is an interesting manuscript (MS) dealing with the assessment of the release of nutrients by two different fertilizers one incorporated in soil. This information can be useful not only for scientists but mainly for land managers, being of broad interest. However, the manuscript must be improved before publication to better explain the procedure followed to carry out the incubation experiment. The statistical analyses must be remade, and more discussion about some aspects is needed. I expose my comments below:

Objectives: -You have to be more explicit with the objectives. I do not really understand what you mean with "behaviour" of nutrients released and their effects on the chemistry of soil". You have just checked how different nutrients increase in soil after the addition

of two fertilizers, assessing the losses by leaching. Really indicate what you have planned.

Materials and Methods:

-You have design and experiment under saturated conditions, indicating no aeration, and thus reduction conditions. However, these saturated conditions are not the ones found at field under agricultural management in this kind of soil. Explain in Discussion how results under these conditions can be extrapolated to aerated soils.

-You have to better explain the procedure to carry out the incubations. Explain how distilled water was added and the criteria followed to select the quantity, intensity and frequency. Was it a continuous flow? Was it periodically added? When, how, why? You have to respond these questions in the text. You indicate in RD that the quantity added is equivalent to 13 years rainfall. But you must explain the reasons to select this amount and how was it added. Is it not too much water to simulate 13 years in 80 days? Are not you overforcing the system? Justify.

-You indicate that you collected 6 leachate samples for 15 days. Was the flow of leaching continuous? What is the criteria to collect 6 samples? What was the quantity collected at each sampling. These details must be explained.

-In this section you indicate that you measured Na and Al but they are not shown in the Results and Discussion. Delete them from here so.

-Statistical analyses: you must repeat the statistical treatment of the data. Your samples are dependent since you used the same soil sample collected in the field and applied treatments to this sample in the lab throughout an incubation experiment. Thus, you cannot carry out and ANOVA for independent variables. You must carry out Repeated Measures ANOVA with "incubation time" as within-subject factor and "fertilizer" as between-subject factor. Indicate as well how normality of data was ensured and the post-doc test used for means comparison. Indicate the selected level of significance.

Results and Discussion:

-It is difficult to follow the explanation of every parameter and treatment without the proper explanation of the experimental procedure. Since I said before, you have to explain in MM how was the water added to each column, the selected flow (V/t), frequency of addition and why this selection.

-To better understand and visualize the actual effect of fertilizers on soil nutrients, I would subtract the control values from the values in soils incubated with the fertilizers for all properties measured and represent these Δ in all the graphs. So, in the graphs you won't show the control values, but only the values of the samples fertilized. With this approach you really assess the actual contribution of the fertilizers, since you extract the release from soil constituents.

-Pag 1561, lines 1-11. The pH can affect these variable charges. How the pH in your soil may influence the actual variable charges of soil colloids? Discuss it.

-You must indicate in the text, when explaining the pattern of the properties, not only their trend with time, but also the correspondence with cumulative percolated water, since in the graphs this is the unit you use, and it is difficult to follow the writing in the graphs if different units are used.

-You should discuss why these slow release nutrients tablets release so many nutrients the first days after they stabilized.

-Pag 1564, lines 20-24 and Table 3. Refer the "leached" as accumulated leaching loss referred to the initial amount to facilitate comparisons.

-Pag 1564, lines 25/28. What do you mean with "ect" in the last line of the page? Give the possible possibilities where N can be retained according to literature findings. It is quite strange that 99

-Pag 1565, line 1. Leaching is very low to explain the lack of N accumulation in soil. Explain it better.

Tables and Figures

-Include the standard deviation in all tables and figures.

-Include and a) in the upper graph and b) in the lower graph of the figures and refer to Figure Xa or Figure Xb along the text.

-It is difficult to me to understand these graphs with the accumulated percolated water in X axis instead of time since you explain in the text the evolution of the properties with time. Since I do not know the flow of the added water (amount added per time) I can't totally comprehend the information provided by the graphs. You should clearly indicate the water flow and duration of the experiment in the figure caption. To make it easier to understand, I suggest you two options: a) include time of incubation in the X axis; b) rewrite the way RD section is explained to correlate time with accumulated percolated water. If you keep the current version with accumulated percolated water, please define 5 or 10 L as range in the X axis instead of 20L.

-Include the F-value with the P-value in all tables.

-Table 3. Apart from relative values, include in the table the actual absolute values. Make the difference between released and leached, and this quantity must be the amount retained in soil. Compare this theoretical difference in the nutrients level with the increments observed in Table 2, and assess if values match or there have been some loss not taken into account. Discuss these findings.

-Figure 1. Include the same number of decimals in the axis. I miss a graph like this with electrical conductivity to know how these tablets affect soil and leachates salinity. Do you have these data?

I include minor comments directly on the pdf attached.

Please also note the supplement to this comment:
http://www.solid-earth-discuss.net/6/C732/2014/sed-6-C732-2014-supplement.pdf