

Interactive comment on “Fixation kinetics of chelated and non-chelated zinc in semi-arid alkaline soils: Application to zinc management” by Theophilus K. Udeigwe et al.

Anonymous Referee #1

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Comments on manuscript “Fixation kinetics of chelated and non-chelated zinc in semi-arid alkaline soils: Application to zinc management”

The manuscript is evaluates the availability of Zn in semi-arid alkaline soils. The several analysis conducted on the soils allow the discussion of the kinetic effects in the Zn availability in soils as well as its relation with other micronutrients. The experiments developed can be of interest for readers of the Solid Earth; it fits with the journal scope and contributes significantly to the advance in the knowledge of Zn in soils. In general, the manuscript has been well distributed, the experiments well described and an adequate discussion is presented. However, the manuscript is directly connected with a recently publish paper (Solid Earth Discuss., 7, 2875–2902, 2015) in which the same

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methodological approach was performed to examine the fixation kinetics of chelated and non-chelated copper micronutrient in semi-arid alkaline soils. In both papers, exactly the same experiment is present: soil collecting, soils analysis, soil fertilization with a mixture of Fe, Mn, Zn, and Cu chelated (or non chelated). While in the published one the results for Cu concentrations after fertilization and correlations with other micronutrients are presented, in the current paper under review it is the Zn results and correlations. In fact it seems that only one experiment was performed and the results have been divided for the two manuscripts and maybe for two future ones on Mn and Fe. The text is frequently the same. From my opinion, it is the Editor who must decide if this way of results dissemination is valid. If this is a possible way of publication, I suggest, however to refer this paper to the previous one more clearly. In Line 85 this paper is cited but in a poor way. Moreover, I suggest other changes: - the soil properties have been presented as new results in Results section in Tables 1, 2, 3. Exactly the same values were presented in the previous paper. For this reason, the soil properties must be referred to the previous paper and not presented as new characterization. -In Table 5, the correlation with other metals is presented. In the previous one the correlation Cu/Zn was already presented. -Line 195-196: the comments are very general; the values are not according to the table. -Line 209-210: Rewrite the sentence. It is not clear. -Line 237-238: The half-life of EDTA is possible not the main explanation for the decrease in Zn stability with EDTA in long times. Authors must also explore other metal competences such as Ca which is the main competitor for EDTA in alkaline-calcareous soils. -Line 257-259: the comments are highly general considering the large interval range recorded in R2. Please, re-write. -Line 261-263: the relation Cu-Zn is presented. No reference is done here to the previous paper despite the same values of correlations have been found. -An important correlation has been found for Zn/Cu in non-chelated systems. Authors must discuss better this important fact and compare with the literature. -Line 283. Coefficient of determination is described as R2. Please, check the correct nomenclature for R2. -The fixation kinetics for Zn in chelated systems has not been finally explained. The authors must deep into this fact and try to

apply other models and cited literature with similar works.

In conclusions it is mentioned that this papers contributes to understanding the Zn fixation chemistry in soils. However, a poor discussion has been done. Authors must correlated results with soil chemistry literature and try to explain which reactions are contributing to metal decrease: chelate dissociation, adsorption in soil materials such as clays, charges, precipitation, redox, etc.

Table 4. Authors kept the footnote referring Cu. This is referring Zn. Table 5. A further explanation of the equation is needed. The value with statistics is not properly described (it must be indicated if R or pearsons P is presented). The slope is underline, specify this and reason.

Interactive comment on Solid Earth Discuss., doi:10.5194/se-2016-51, 2016.

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