Revista Brasileira de Ciência do Solo

Division – Soil Use and Management | Commission – Soil Fertility and Plant Nutrition

Response to Letter to the Editor on “Base saturation is an inadequate term for Soil Science”

Reinaldo Bertola Cantarutti[(1)*] and José Miguel Reichert[(2)]

[(1)] Universidade Fderal de Viçosa, Departamento de Solos, Viçosa, Minas Gerais, Brasil.
[(2)] Universidade Federal de Santa Maria, Departamento de Solos, Santa Maria, Rio Grande do Sul, Brasil.

In response to the Letter to the Editor on “Base saturation is an inadequate term for Soil” (Tiecher et al., 2022), the editors of RBCS, Reinaldo Bertola Cantaritti and José Miguel Reichert, would like to thank for the issues raised and discussion provided by the authors on the terms "sum of bases" and "base saturation" .

The theoretical fundamentals presented by the authors to characterize the alkali metals (Na and K) and alkaline earth metals (Ca and Mg), Group 1 and 2 in the periodic table, respectively, is adequate. This foundation supports the common sense (whether in the scientific environment or not) that the metals Ca, Mg, K and Na are of “basic character”, and this is not an exclusive perception of Soil Science (chemistry and fertility).

The terms “sum of bases” and “base saturation” used in Soil Science are historically based on this common sense. However, the simple replacement of the terms “sum of bases” and “base saturation” is not enough to overcome the misconception that basic cations act directly on soil acidity correction. The fact that the correction of soil acidity is effectively promoted by the “proton acceptor anion”, usually associated with a “basic character cation”, is an elementary knowledge that should be emphatically used in the teaching of soil chemistry and fertility.

The parallel made with the concept of Al saturation also does not seem adequate to justify the imprecision of the expression base saturation. In this context, it is also inaccurate to symbolize exchangeable acidity, extracted by a saline solution (KCl 1 mol L^{-1}) by the ionic form Al^{3+}, since other metal ions, such as Fe^{3+}, are also passive to undergo solvation by water molecules, resulting in a proton imbalance, with acidification of the soil solution. Furthermore, there is a contribution of dissociable pH-dependent acidity in the equilibrium pH between the soil and the unbuffered KCl 1 mol L^{-1} solution. Thus, it would be pertinent to decouple the Al ion from exchangeable acidity, and Al saturation could be replaced by acid saturation.

In conclusion, it is not responsibility of the Revista Brasileira de Ciência do Solo (RBCS) nor of the Sociedade Brasileira de Ciência do Solo to decide on the adoption or not of the proposed denominations for sum of bases and base saturation.

*** Corresponding author:**
E-mail: cantarutti@ufv.br

How to cite: Cantarutii RB, Reichert JM. Response to Letter to the Editor on “Base saturation is an inadequate term for Soil Science”. Rev Bras Cienc Solo. 2022;46:e0220125a.
https://doi.org/10.36783/18069657rbcs20220125a

Thus, the Editors decided to publish the Letter to the Editor without any changes, despite the reservations about the arguments presented by the authors. With this publication in the RBCS, the offered proposition may receive critical analysis from the soil science scientific community. This community will, in fact, attest to the feasibility of the proposed terms to replace the established concepts of sum of bases and base saturation.

REFERENCE

Tiecher T, Gatiboni L, Rheinheimer DS, Bissani CA, Martins AP, Gianello C, Dick DP, Bortoluzzi EC, Escosteguy PAV, Silva LS, Brunetto G, Mallmann FJK, Pauletti V, Lourenzi CR, Sousa RO, Carlos FS, Azevedo AC. Base saturation is an inadequate term for Soil Science. Rev Bras Cienc Solo. 2022;46:e0220125. https://doi.org/10.36783/18069657rbcs20220125