Review of: "Excessive Aluminum in Soil: Review Paper"

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Potential competing interests: No potential competing interests to declare.

This paper deals with a topic with a vast amount of material in the relevant literature. The problem of aluminum toxicity, especially in highly weathered tropical and subtropical soils, has been known for around 80 years. The paper deals very superficially and does not provide new information on the topic. Furthermore, it presents some inconsistencies:

“Application of aluminum-based fertilizers can also contribute to the accumulation of aluminum in soil (Vitorello et al., 2005).”

Aluminum-based fertilizers – This term is not valid. There is no fertilizer whose synthesis is based on aluminum.

“2 - Another method for assessing soil aluminum concentration is by measuring soil pH.”

This statement is not always correct. By measuring the pH of the soil, it can be inferred whether or not there is the possibility of aluminum in concentrations that are toxic to plants. When the soluble Al content is high, the pH value must necessarily be very low, that is, the soil is very acidic, in one of the forms illustrated in Figure 1 of this paper, positive mono-, bi-, or trivalent. Or, in alkaline conditions, with pH values above 8.0, soluble aluminum can be found forming negatively charged molecules. There is a pH range between 5.7 and 7.8, a pH range suitable for the growth of the vast majority of vegetables, in which the solubility of aluminum decreases practically to zero and, therefore, is non-toxic to the plant.

The best way to know whether or not there is aluminum in the soil at levels that are toxic to plants is to determine the exchangeable aluminum content in the soil using established methods in soil fertility laboratories around the world.

“These strategies include proper soil management practices, such as liming to increase the pH of acidic soils and reduce aluminum availability. Furthermore, regular soil testing can help identify areas with excessive aluminum levels and enable targeted remediation efforts (Fageria et al., 1988).”

Chemical analysis of soils for fertility purposes is an established tool in world agriculture, as well as, based on analytical results, the recommendation for liming, a practice recommended for around 80 years in countries in the northern hemisphere and 60 years in soils from highly weathered tropical/subtropical regions. Therefore, this practice cannot be included in the item “Future Outlook: Preventing Aluminum Overload in Agricultural Lands.”