Review of: "Synthesis, Characterization and Ameliorative Effect of Iron Oxide Nanoparticles on Saline-Stressed Zea Mays"

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Potential competing interests: No potential competing interests to declare.

The article, Synthesis, Characterization and Ameliorative Effect of Iron Oxide Nanoparticles on Saline-Stressed Zea Mays, is based on the premise that iron oxide nanoparticles were synthesized and characterized and the effects of the nanoparticles on saline-stressed maize were investigated. The paper should only be considered for publication if the formation and presence of iron oxide nanoparticles can be verified.

The authors utilized EDX and XRD to investigate the presence of the iron oxide nanoparticles. The author mentioned that an EDX device was used to determine the energy content of the nanoparticles. EDX spectroscopy is used to determine the elemental composition of materials, and hence it can be utilized to determine the purity of materials based on chemical composition analysis. It is not used to analyse or determine the energy content, as the authors stated on two occasions in the article. The authors do not mention whether the EDX analysis was carried out on the SEM or TEM tool.

The EDX spectrum in Figure 4 does not show the presence of iron and oxygen as the authors appear to suggest. The peaks are mislabelled, intentionally or unintentionally. Based on X-ray data, the oxygen peak is at around 0.5 keV, not around 1.0 keV as indicated, and iron does not have any peaks between 2.0 keV and 3.0 keV. The main peaks (k_α & k_β peaks) of iron are at 6.4 keV and 7.06 keV, and other iron peaks are found at 0.705 keV and 0.719 keV. Based on the precursor used in the investigations, the peaks labelled as Fe peaks are most likely to be chlorine peaks at 2.621 keV and 2.816 keV. The authors should send the original EDX spectrum with auto-identified peaks to the editor, together with the corresponding STEM-EDX spectral images, for verification. The authors should also provide information on where the EDX spectroscopy was conducted for verification that the results were not manipulated.

The author correctly interpreted that the XRD results in Figure 5 do not show prominent peaks of iron oxide nanoparticles (even though they said Fe). These XRD results are simply confirming that there were no iron oxide nanoparticles, as revealed by the EDX results, not that the surface structure is amorphous, as suggested by the authors. XRD is not used to characterize or analyse the surfaces of materials. Furthermore, the authors did not compare their XRD results to any reference database such as JCPDS data.

To conclude, the EDX results in Figure 4 do not show the presence of both Fe and oxygen, and the XRD results in Figure 5 also do not show the presence of iron oxide. The authors need to prove that iron oxide nanoparticles were formed. Their EDX and XRD characterization results do not confirm the formation of iron oxide nanoparticles.