Future studies should standardize the reporting of salinity level, electrical conductivity, actual NaCl concentration, effective Si concentration, Si source, pH, accompanying K content, application frequency, and tissue Si concentration. Means, SD or SE values, and the number of biological replicates should also be reported in full. Such information would make it possible to conduct rigorous random-effects meta-analyses and to examine dose-response relationships rather than merely comparing treatment and control groups. The next stage of research should also shift from an emphasis on seedling traits toward the entire crop cycle. Fruit number, mean fruit weight, marketable yield, total yield, water-use efficiency, and the cost of Si application should all be included. Multi-year and multi-location experiments across different soil textures and irrigation salinity levels are particularly needed. Only then will it be possible to determine whether Si functions mainly as a laboratory-scale "stress-alleviating agent" or can be developed into a reliable management practice for pepper production under saline conditions.

What is relatively clear at present is the phenotype: under many conditions, Si reduces Na^+ and MDA accumulation, improves plant water status, and enhances antioxidant defense. What remains less clear is where these responses are initiated. Future studies could integrate the tissue distribution of Na^+, K^+, Ca^{2+}, and Mg^{2+} with metabolomic, transcriptomic, and proteomic analyses, with particular attention to aquaporins, the SOS pathway, ABA signaling, and ROS signaling. A transcriptomic basis for salinity responses in pepper is already available. Incorporating Si treatments into such frameworks could move the field beyond the question of whether Si is effective toward explaining why it is more effective in a particular genotype and at a particular salinity level.

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Conflict of Interest Disclosure

The authors affirm that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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