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The evaluation of foliar micromorphology for detection of compounds and anti-nutritional factor of two selected wild vegetables native to South Africa: Suitability of wild plants as food

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Introduction: Among the unconventional crops widely distributed throughout the wild in South Africa are native species, while other wild vegetables were introduced and adopted by indigenous people in South Africa. These belong to the Solanaceae and Urticaceae family, *Solanum nigrum L (S. nigrum)* and *Urtica lobulata (U. lobulata)* L. E. Mey species respectively. *S. nigrum and U. lobulata* are widely distributed in various areas in the Eastern Cape Province of South Africa and are used as food by some of the rural communities. These are economically important as wild vegetables, medicinal plants and weeds. Studies on Agropastoral societies indicate that these plant resources play a significant role in nutrition, food security and income generation.

Methods & Statement of Objectives: The foliar micro morphological studies carried out on the leaves and stems of *S. nigrum* and U. lobulata were observed with the JEOL (JSM-6390LV) Scanning Electron Microscopy (SEM) for better understanding of structural details and inorganic mineral elements deposits on the plants for supply of micro-nutrients for the poor communities. The content quantity of some of these secondary metabolites was also determined in the study using Atomic Absorption Spectrophotometer.

Results: Both the abaxial and adaxial surfaces were characterized by anisocytic stomata which were more prevalent on the abaxial surface than the adaxial surface of *S. nigrum*. The leaves of the *S. nigrum* species have only one type of multicellular non-glandular trichomes (NGTs) that are short and cylindrical, tapering to a sharp point while all parts of the U. lobulata are densely covered with stinging hairs characterized by the presence of multicellular glandular and non-glandular trichomes (GTs and NGTs). Crystal deposits were also observed on the surfaces of the leaves near the stomata and on the stem. Characteristically, a very interesting aspect of the chemistry of Urticaceae family is the production of phytonutrients and anti-nutritional secondary metabolites out of the secretary structure such as flavonoids, alkaloid, phenolic acids, saponnins, phytates and tannins. Results of SEM showed deposits of dihydrate crystals which when translated to energy dispersive X-ray spectroscopy (EDXS) analysis the spectra indicated that Ca, Al, Fe, Na, Si, K and CaC2O4-calcium oxalate were the major constituents of the crystals analyzed.

Conclusion: The concentrations of the selected secondary metabolites in the two species were determined to be lower than the levels considered to be toxic. These results are evidence that wild edible plants can be considered safe to be utilized as vegetables and to alleviate micronutrient, particularly mineral deficiencies amongst the resource poor communities.

Biography

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