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Horticultural Science

Application of synchrotron radiation X-ray fluorescence to investigate the distribution of mineral elements in different organs of greenhouse spinach

Xin S.Z., Song Y.J., Lv C., Rui Y.K., Zhang F.S., Xu W., Wu D., Wu S., Zhong J., Chen D.L.,Chen Q., Peng F.T.:

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[fulltext]

Consumption of vegetables is one of the most important ways of providing the body with mineral elements. However, it is not clear how mineral elements are distributed in different organs of vegetables, especially vegetables grown in greenhouses. The distribution of mineral elements in the root and leaves of

greenhouse spinach was determined using synchrotron radiation XRF, the results indicated that the amount of various elements in different parts of the leaves, roots and stems were inequable. Generally, the content of the elements in the root base were slightly higher than in the other parts. The amounts in the root apices were much lower than those in the other parts while the amount of every element decreased gradually from the root base to the root apices. In stems, the amount of K, Ca, Fe, Ni, and Zn were higher in the base of the stem than in the top of stem while the amounts of Co and Cu were higher in the top of the stem than in the base of stem. From all the elements detected in the stem, Mn was at the lowest concentration. In leaves, Co and Zn were primarily accumulated around the main veins and the amount of Mn in the tip of the leaf was higher than in the other parts. In contrast, K, Ca, Ni, and Cu were higher in the center of the leaf.

Keywords:
spinach; distribution of mineral elements; synchrotron radiation XRF; leaves; roots; stem

[fulltext]