

عنوان مقاله:

The metabolic response of soybean root to iron deficiency

محل انتشار:

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خلاصه مقاله:

Iron deficiency responses were investigated in roots of soybean, a Strategy I plant species. Soybean responds to iron deficiency by decreasing growth, both at the root and shoot level. Chlorotic symptoms in younger leaves were evident after a few days of iron deficiency, with chlorophyll content being dramatically decreased. Moreover, several important differences were found as compared with other species belonging to the same Strategy I. The main differences are (i) a lower capacity to acidify the hydroponic culture medium, that was also reflected by a lower H⁺-ATPase activity as determined in a plasma membrane-enriched fraction isolated from the roots; (ii) a drastically reduced activity of the phosphoenolpyruvate carboxylase enzyme; (iii) a decrease in both cytosolic and vacuolar pHs; (iv) an increase in the vacuolar phosphate concentration, and (v) an increased exudation of organic carbon, particularly citrate, phenolics, and amino acids. Apparently, in soybean roots, some of the responses to iron deficiency, such as the acidification of the rhizosphere and other related processes, do not occur or occur only at a lower degree. These results suggest that the biochemical mechanisms induced by this nutritional disorder are differently regulated in this plant. A possible role of inorganic phosphate in the balance of intracellular pHs is also discussed.

کلمات کلیدی:

Fe(III)-chelate reductase, Glycine max L, intracellular pH, iron deficiency, PM H⁺-ATPase

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