IN SITU RATIO IMAGING ANALYSIS OF APOPLASTIC PH IN INTACT LEAVES OF *VICIA FABA* L. PLANTS IN RESPONSE TO DROUGHT STRESS

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The apoplastic pH changes in leaves have been considered as an important signal in plants under soil drying. Root-sourced signals travel in the xylem to leaves and, consequently, transpiration and growth rate in leaves are reduced. Plants in drying soil generate a high leaf apoplastic pH, which drives ABA partitioning into the apoplast with greater effect on stomata. We used *in situ* fluorescence ratio imaging to analyze precisely the temporal changes in apoplast pH in intact leaves of *Vicia faba* L. plants under progressive drying. The pH-sensitive fluorescence probe, in combination with ratio imaging microscopy, was used to measure leaf apoplastic pH in fully developed leaves of *V. faba*. The maximum change of 1.32 pH unit was observed after 11 days of drought but its gradual increase started in the leaves after 2 d. These changes were greater in younger leaves of 0.40 pH unit than in older leaves. The pH changes were associated with reduced transpiration rate and leaf growth. Leaf water potential was significantly decreased after 4 d, transpiration rate was reduced after 5 d and leaf growth was reduced after 6 d of soil drying. We showed early pH changes in shoot but no such pH changes were recorded in xylem sap from roots. Therefore, how were pH changes in shoot apoplast initiated under drying remains still controversial.

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