

Cadmium toxicity induced alterations in the root proteome of green gram in contrasting response towards iron supplement

ABSTRACT

Cadmium signifies a severe threat to crop productivity and green gram is a notably iron sensitive plant which shows considerable variation towards cadmium stress. A gel-based proteomics analysis was performed with the roots of green gram exposed to iron and cadmium combined treatments. The resulting data show that twenty three proteins were down-regulated in iron-deprived roots either in the absence (-Fe/-Cd) or presence (-Fe/+Cd) of cadmium. These down-regulated proteins were however well expressed in roots under iron sufficient conditions, even in the presence of cadmium (+Fe/+Cd). The functional classification of these proteins determined that 21% of the proteins are associated with nutrient metabolism. The other proteins in higher quantities are involved in either transcription or translation regulation, and the rest are involved in biosynthesis metabolism, antioxidant pathways, molecular chaperones and stress response. On the other hand, several protein spots were also absent in roots in response to iron deprivation either in absence (-Fe/-Cd) or presence (-Fe/+Cd) of cadmium but were well expressed in the presence of iron (+Fe/+Cd). Results suggest that green gram plants exposed to cadmium stress are able to change the nutrient metabolic balance in roots, but in the mean time regulate cadmium toxicity through iron supplements.

Keyword: Cadmium toxicity; Iron supplement; Proteomics