The Role of Lipid Peroxidation in Aluminium Toxicity in Soybean Cell Suspension Cultures

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The primary reactions leading to Al toxicity in plant cells have not yet been elucidated. We used soybean (*Glycine max* [L.] Merr.) cell suspension cultures to address the question whether lipid peroxidation plays an important role in Al toxicity. Upon transfer to an Al-containing culture medium with a calculated Al^{3+} activity of 15 μM soybean cells showed a distinct and longtime increase in lipid peroxidation within 4h. At the same time a drastic loss of cell viability was observed. Butylated hydroxyanisole (BHA) and *N,N'*-diphenyl-*p*-phenylenediamine (DPPD), two lipophilic antioxidants, were able to almost completely suppress lipid peroxidation in Al-treated cells at a concentration of 20 μM. This effect was dose-dependent for DPPD and was observed at minimum concentrations of 1–2 μM. When lipid peroxidation was suppressed by DPPD or BHA cell viability remained high even in the presence of toxic Al concentrations. These results suggest that Al-induced enhancement of lipid peroxidation is a decisive factor for Al toxicity in suspension cultured soybean cells.