Title Aromatic- and di-carboxylates inhibit wound-induced phenolic accumulation in excised lettuce (*Lactuca sativa* L.) leaf tissue

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Abstract

Excision of de-bladed 5-mm mid-rib segments from Romaine lettuce leaf tissue induced a five-fold rise in phenolic concentration when held at 10 °C for 48 h. Immersion in aqueous solutions of various di-carboxylates and aromatic carboxylates for 1 h reduced this wound-induced increase. The decrease was linear for di-carboxylates with increasing length from 3 to 14 carbons, with the phenolic concentration becoming less than the control for compounds with more than 6 carbons. Aromatic carboxylates with a hydroxyl at the 2 position and another at an even position produced an average reduction of 46%, while aromatic carboxylates with no hydroxyl groups, groups at odd positions, or adjacent groups produced an average 12% reduction. The decrease in wound-induced phenolic accumulation produced by 10 mM solutions of aromatic- and di-carboxylates was linearly correlated ($R^2 = 0.91$) with the rate of carbon dioxide production, indicating possible tissue damage. This possibility was supported by the fact that most effective concentrations were highly correlated with increased ion leakage, another measure of tissue damage. While delaying the application of inhibitors of wound signal synthesis (e.g., *n*-alcohols) decreases their effectiveness, delaying the 1 h immersion in aromatic and di-carboxylate solutions for 4 h did not significantly reduce their effectiveness. Like mono-carboxylates, aromatic and di-carboxylates do not appear to be interfering with the synthesis or propagation of a wound signal, but appear to be inhibiting phenolic synthesis and/or accumulation at some subsequent step in the wound response.