Abstract

A wound signal originates at the site of injury in lettuce (*Lactuca sativa* L.) leaf tissue and propagates into adjacent tissue where it induces a number of physiological responses which include increased phenolic metabolism with the de novo synthesis of phenylalanine ammonia lyase (PAL, EC 4.3.1.5), the synthesis and accumulation of soluble phenolic compounds (e.g., chlorogenic acid), and subsequent tissue browning. Exposing excised mid-rib leaf tissue to vapors (20 μmol/(g FW)) or aqueous solutions (100 mM) of *n*-alcohols inhibited this wound-induced tissue browning by 40 and 60%, respectively. Effectiveness of the alcohol increased linearly from ethanol to the 7-carbon heptanol, and then was lost for the longer *n*-alcohols 1-octanol and 1-nonanol. The 2- and 3-isomers of the effective alcohols did not significantly reduce wound-induced phenolic accumulation at optimal 1-alcohol concentrations, but significant reductions did occur at much higher concentrations (100 μmol/(g FW)) of the 2-, and 3-isomers. The active *n*-alcohols were maximally effective when applied during the first 2 h after excision, and were ineffective if applied 6 h after excision. Phospholipase D (PLD) and its products linolenic acid (LA) and phosphatidic acid (PA) are thought to initiate the oxylipin pathway that culminates in the production of jasmonic acid, and PLD is specifically inhibited by 1-butanol, but not by 2-, or 3-butanol. These results suggest that PLD, LA, PA, and the oxylipin pathway may be involved in producing the wound signal responsible for increased wound-induced PAL activity, phenolic accumulation and browning in fresh-cut lettuce leaf tissue.