

Title Diphenylamine inhibits respiration of green bell peppers.
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Abstract

The mechanism by which diphenylamine (DPA) controls superficial scald in apples and reduces chilling injury in green bell peppers [*Capsicum annuum* var. *annuum* (Grossum Group)] has been assumed to be related to its antioxidant activity. In the present study, DPA inhibited the respiratory activity of green bell pepper fruit as well as oxygen uptake by the mitochondria isolated from them. When the alternative oxidase was inhibited with n-propyl gallate or disulfiram during state 4 respiration, DPA did not further inhibit O₂ uptake. Treating green bell peppers with DPA before storage did not alter the induction and abundance of the alternative oxidase protein in mitochondria which was maximally induced in peppers stored at 4 deg C. Whether added before or after the uncoupler, 2,4-dinitrophenol, DPA negated the enhanced O₂ uptake associated with uncoupling of electron transfer in isolated mitochondria. These observations indicate that DPA inhibits the flow of electrons through the cytochrome path, probably somewhere in the cytochrome bc₁ complex. Although the secondary amine function of DPA makes it a powerful antioxidant, the effectiveness of DPA in reducing chilling injury in green bell peppers and superficial scald in apples (*Malus sylvestris* var. *domestica* [*M. pumila*]) also may be due, in part, to its inhibition of respiration.