# Impact of Salicylic Acid on the Antioxidant Enzyme System and Hydrogen Peroxide Production in *Cucumis sativus* under Chilling Stress

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Z. Naturforsch. **66 c**, 413–422 (2011); received September 28, 2010/January 16, 2011

Salicylic acid (SA) is a naturally produced compound and has been implicated to play important roles in defense of plants against diverse biotic and abiotic stresses. To understand how SA functions in the tolerance of cucumber (*Cucumis sativus*) to chilling stress, endogenous SA levels in two different cultivars with opposite chilling responsiveness were quantified. Membrane integrity, including malondialdehyde (MDA) content and leakage of electrolyte, was also examined in SA-pretreated cucumber plants under chilling conditions. In addition, activities of the two antioxidant enzymes peroxidase (POD) and catalase (CAT) were quantified, and hydrogen peroxide ($H_2O_2$) production was investigated histochemically in SA-treated leaves under chilling temperature. Chilling stress resulted in greater induction of SA levels in the chilling-tolerant cultivar Changchun mici in both leaves and seeds compared to the chilling-sensitive one Beijing jietou, while the former one contained higher levels of SA than the latter one in the seeds under normal conditions. Pretreatment with SA diminished the increased electrolyte leakage and MDA content caused by chilling in the leaves of both cultivars, while much less MDA and electrolyte leakage were produced in Changchun mici compared to Beijing jietou. Moreover, exogenous application of SA increased significantly the POD and CAT activities and soluble protein content. Most importantly, exogenous SA treatment could eliminate the accumulation of $H_2O_2$ in leaves and cotyledons of both cultivars caused by chilling stress. The data clearly demonstrated that the chilling-tolerant cultivar displays a higher SA level than the chilling-sensitive one, and that exogenous SA can enhance the chilling tolerance ability, which might be achieved through modulating the antioxidant system in cucumber.

*Key words:* Chilling Stress, *Cucumis sativus*, Salicylic Acid