The involvement of NO in ABA-delayed the senescence of cut roses by maintaining water content and antioxidant enzymes activity

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Abstract

Abscisic acid (ABA) coordinates plant growth and development as internal signals. Nitric oxide (NO) as an essential endogenous signal molecule may prolong the vase life of cut flowers. However, the interaction of between ABA and NO during postharvest life of perishable horticultural products was not clear. Here, cut roses were used to investigate the interaction between NO and ABA during the senescence of cut flowers. The results showed that ABA increased the vase life and flower diameter of cut roses in a dose-dependent manner, with maximal biological responses at 0.5 μM. Sodium tungstate, an NO biosynthesis inhibitor, significantly suppressed the vase life and diameter enhanced by ABA, indicating that endogenous NO might be involved in ABA-regulated cut flower senescence. ABA and a NO donor sodium nitroprusside (SNP) effectively increased leaf relative water content and reduced the rate of water loss via inducing stomatal closure. ABA and NO treatments significantly increased the activity of superoxide dismutase, peroxidase and ascorbate peroxidase and the content of leaf chlorophyll. Sodium tungstate also prevented the effects of ABA mentioned above. Altogether, NO may play a crucial role in ABA-delayed the senescence of cut roses by retarding water loss, stimulating enzyme activity and maintaining leaf chlorophyll content.