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P14. Nitrosative responses is a general feature of citrus plants exposed to abiotic stress conditions

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Nitric oxide (NO) is a key signalling molecule in plants. However, little is known about the metabolism of endogenous NO in plants under abiotic stress. Using citrus plants exposed to six different abiotic stress conditions (high light intensity, continuous dark, low and high temperature, drought and high salinity), several aspects of the NO-related metabolism were investigated. Abiotic stress treatments induced the active production of NO in the leaves of plants, particularly as evidenced under high temperature and high light conditions. Increased NO production was localized in different leaf tissues by confocal laser scanning microscopy using the fluorescent probe 4,5-diaminofluorescein diacetate. Salinity and drought resulted in strong nitrosative DNA damage induced by peroxynitrite further indicated that abiotic stress situations elicited nitrosative challenges in citrus plants. Using different experimental approaches the molecular crosstalk among signalling pathways involved in the production of NO under stressful conditions were identified. In addition, the relationship between S-nitroso glutathione reductase and glutathione redox homeostasis plays a strong signalling role in the high light, dark and high temperature responses. Most of the observed abiotic stress responses were mediated in the NO-overproducing plants through post-translational protein modifications, including carbonylation, S-nitrosylation and Tyr nitration. Gene expression profiling experiments revealed that various NO-associated genes in citrus plants were also responsive to abiotic stress conditions. These results indicate that nitrosative responses are key components in plant's behavior against environmental stimuli and further provide new insights into NO-mediated signalling.