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Nitrite and nitric oxide are important in the adjustment of primary metabolism during the hypersensitive response in tobacco

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Nitrate and ammonia deferentially modulate primary metabolism during the hypersensitive response in tobacco. Tobacco RNAi line with low nitrite reductase (NiR^r) levels were used to investigate the roles of nitrite and nitric oxide (NO) in this process. This line accumulates

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NO_2^-, with increased NO generation, but allows sufficient reduction to NH_4^+ to maintain plant viability. Inoculation of the NO_3^- grown wild type and NiR^r plants with the non-host biotrophic pathogen *Pseudomonas syringae* pv. *phaseolicola* induced an accumulation of nitrite and NO, together a hypersensitive response (HR) that resulted in decreased bacterial growth, increased electrolyte leakage and enhanced pathogen resistance (PR) gene expression. These responses were higher with increase in NO/ NO_2^- levels in NiR^r plants than WT under NO_3^- nutrition. In contrast NH_4^+ grown WT and NiR^r plants exhibited compromised resistance. A metabolomic analysis detected 141 metabolites, whose abundance was differentially changed as a result of exposure to *P. syringae* pv and in response to NO/ NO_2^- accumulation Of these, 13 were involved in primary metabolism and most were linked to amino acid and energy metabolism. HR-associated changes in metabolism that are often linked with primary nitrate assimilation may therefore be influenced by nitrite and NO production.

Nitrite, Nitrate, Nitric Oxide, amino acid metabolism, Nitrite reductase

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