Abstract:

Nitric oxide (NO*) is a highly bioreactive molecule that targets either a redox or an additive chemistry, and accordingly reacts with metal- and thiol- containing proteins including signaling proteins, receptors, enzymes, transcription factors and DNA. In many plant systems, by down-regulating ethylene production, NO* delays senescence. Its involvement in the regulation of a wide spectrum of cellular functions via signal transduction pathways is impressive. As ethylene is involved in flower abscission and leaf senescence of cut flowerheads of phlox, this investigation was initiated to evaluate the effect of NO* on postharvest performance of phlox cut inflorescences. Sodium nitroprusside (SNP) was used as the source of NO* donor. Freshly harvested flowerheads of 'John Fanick' phlox were placed in glass vases containing water or SNP solution (10-200 μmol·L-1) at 22±1 °C under florescent lamps. In phlox, flower abscission was initiated within 72 hours, whereas visual yellowing of the leaves was observed after 8-10 days. During flower abscission only the funnel-shaped corolla with epipetalous stamens is shed. With an increase in the NO* concentration a concomitant rise in flower abscission occurred. At high concentrations (>50 μmol·L-1), and within a week, toxicity symptoms in the form of development of blackening leaves, were also clearly visible, usually starting on the lower leaves and moving progressively upward. However, the flowers did not exhibit any toxic symptoms, and the new buds continued to open even at relatively high concentrations. Preliminary results indicated that the deleterious effects of NO* could be greatly counteracted by a simultaneous application of thidiazuron in the solution. Experiments are in progress to further elucidate the action of these chemicals in postharvest performance of cut flowerheads.