Photosynthetic reaction of symplast and apoplast plants on nitrate concentration increasing

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We carried out the comparative analysis of nitrate influence on $^{14}CO_2$ assimilation and export photosynthetic ^{14}C-product from *Chamerion angustifolium* (symplastic plant) and *Linum ussitatissimum* (apoplastic plant) leaves. It was shown that nitrate caused a decrease in $^{14}CO_2$ fixation and enhanced assimilate transport in ascending direction in both types of plant. Regardless of the type of plants under nitrate treatment ^{14}C incorporation in sucrose was decreased in short exposures (3 min). Through 3 hours after $^{14}CO_2$ fixation ^{14}C content in sucrose in experimental plants exceeded control (introduction of water). In *Chamerion angustifolium* unlike *Linum ussitatissimum* this pattern was observed for ^{14}C incorporation in olygosugars. Introduction of nitrate solution in flax shoot caused a companion cell vacuolization after 1 hour. Introduction of nitrate solution in apoplast of *Chamerion angustifolium* after 3 hours caused ultrastructural changes of mitochondria and cell vacuolar system pointing to the increase of osmotic pressure in cell cytosol. At the same time in vacuoles of all cells of conducting system an accumulation of fibrillar inclusions was observed. Injection of NO-generator (sodium nitroprusside) at concentrations of 0.1 mM (lower than the potassium nitrate – 50 mm) into flax apoplast caused similar changes of photosynthesis, transport ^{14}C-assimilates and the terminal complex ultrastructure. A conclusion has been made that there are a certain common mechanisms of nitrate ion action on photosynthesis and sugar transport from leaves in symplast and apoplast plant. According to the authors it is associated with pore plugging of phloem by callose, initiated by NO-signaling system.