-Exogenous application of polyamines alleviates water stress induced oxidative stress of Rosa damascena Miller var. trigintipetala Dieck

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Abstract:

The growth and development of Damask rose (Rosa damascena Miller var. trigintipetala Dieck) are drastically inhibited under water stress. Polyamines (PAs) are involved in water stress tolerance. However, very limited information is known concerning the effects of exogenous application of PAs on aromatic plants including Damask rose. This experiment was carried out to study the application of Spermine (Spm) or Spermidine (Spd) on some physiological and biochemical processes to understand the possible mechanisms concerning the water stress alleviation in Damask rose. Plants were exposed to two water conditions: 100% of field capacity (FC) as well watered treatment and 50% of FC as a water stress treatment. Foliar applications of Spm or Spd were applied at 0.5 mM while control plants were sprayed with distilled water. The application of Spm or Spd improved the growth characters, relative water content (RWC), chlorophyll content and stomatal conductance under water stress. Furthermore, proline content and CAT and SOD enzyme activities were also improved by applying Spm or Spd. H2O2 production was restricted and MDA accumulation was limited and hence the membrane stability was retained and the water stress damage was alleviated accordingly. In addition, exogenous application of Spm or Spd reduced the endogenous Put level and increased both Spm and Spd levels which suggest that PAs were implicated in water stress adaptation of Damask rose plants. Enhancing Damask rose from water stress not only by activating the antioxidant machinery but also by balancing the PAs metabolism due to exogenous application of Spm or Spd was suggested.

Keywords:

Spermine Spermidine Water stress Proline Antioxidant enzymes

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