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Effect of Exogenous SA Applications on Physiologic and Biochemical Parameters in St John's Wort Oxidatively damaged under the Saline Condition

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[Introduction]

Melatonin is widely consumed as a stress reliever and sleep aid for the modern people suffering from depression and insomnia. St. John's wort has high amounts of melatonin. Because of this, St. John's wort has long been used as a medicine for the treatment of insomnia and depression in the West. However, in Korea, St. John's wort is not grown for the medicine. The purpose of this study was to prepare for salt stress on St. John's wort when cultivating John's wort in a domestic greenhouse for medicine. To relieve salt stress, SA was exogenously applied to salt-damaged St. John's wort and we examined the biological and physiological changes in the plant. Also, we investigated how salinity stress and SA affects the content of melatonin inside of St. John's wort.

[Materials and methods]

Under controlled environmental conditions, St. John's wort were irrigated with salt or distilled water for 5 days in a greenhouse at Kyungpook National University, Daegu, South Korea. This was followed by 0.25mM of salicylic acid application to determine its recovery impact on the damaged St. John's wort for 3 days. After all the treatment done, several hormone analysis and biochemical experiments were done in salt-stressed and unstressed St. John's wort with or without Salicylic acid.

[Results and discussion]

Our result showed that SA treatment reduced the decrease of height and weight of 5-day-old salinity-stressed plants. Also, SA application in salinity-stressed plants enhanced the content of chlorophyll and antioxidants such as polyphenol and flavonoid as well as the efficiency of photosystem II. However, we found that SA and Melatonin content were drastically increased after the treatment of salinity and lowered by SA after-treatment. It could be because Abiotic stresses usually increase SA to activate the systemic acquired resistance (SAR) system and melatonin to enhance the antioxidant system. This study demonstrated that SA treatment not only recovered the physical growth and biochemical parameters of salinity-damaged St. John's wort but also lowered the level of melatonin, which is phytohormone protecting the plant against abiotic stressors.

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