

Title : Effect of Trehalose on the Levels of Phenolic Compounds, Flavonoids, Anthocyanins, and Related Enzymes in White Radish Sprouts under Salt Stress Conditions

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ABSTRACT

Phenolic compounds, flavonoids, and anthocyanins are secondary metabolites synthesized by plants for specific purposes. These compounds possess antioxidant properties and help protect plants from oxidative damage. Trehalose (Tre) and sodium chloride (NaCl) have been shown to stimulate antioxidant production in various plant species. This study aimed to investigate the effects of Tre and NaCl on the growth and biosynthesis of phenolic compounds, flavonoids, and anthocyanins in radish sprouts (*Raphanus sativus* var. longipinnatus). The experiment was divided into two parts. (1) Effects of Tre, NaCl, and their combination on radish sprout growth – The results showed that treatments with 10 mM Tre, 50 mM NaCl, and their combination (10 mM Tre + 50 mM NaCl) significantly enhanced radish sprout growth, as indicated by fresh weight, dry weight, relative water content, and water status in stems and leaves. (2) Effects of Tre, NaCl and their combination on the biosynthesis of phenolic compounds, flavonoids, and anthocyanins. The study analyzed changes in the levels of these compounds, as well as the activities of phenylalanine ammonia-lyase (PAL), polyphenol oxidase (PPO), and peroxidase (POD) in radish sprouts treated with 10 mM Tre, 50 mM NaCl, and their combination. The results showed that sprouts treated with 10 mM Tre + 50 mM NaCl had the highest accumulation of phenolic compounds, flavonoids, and anthocyanins, which correlated with increased PAL, PPO, and POD enzyme activities. In conclusion, 10 mM Tre combined with

50 mM NaCl effectively enhanced radish sprout growth and stimulated the biosynthesis of phenolic compounds, flavonoids, and anthocyanins by promoting PAL, PPO and POD enzyme activity. This study suggests that the application of Tre and NaCl could be utilized to enhance antioxidant content and growth rates in other plant species.

