

Comparative Analysis of Ascorbate and Glutathione in Paraquat-Tolerant *Rehmannia glutinosa* and Paraquat-Susceptible *Glycine max* L.

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Objectives

Rehmannia glutinosa plants show very high levels of tolerance to the non-selective herbicide paraquat. This study was conducted to examine the role of ascorbate and glutathione in paraquat tolerance in *R. glutinosa*.

Materials and Methods

- Materials: *Rehmannia glutinosa* (accession Korea), *Soybean* (cv. Danbaek)
- Methods:
 - H₂O₂: Amplex Red Hydrogen Peroxide Assay Kit (Molecular probes)
 - Total antioxidant content: Antioxidant status assay kit (Calbiochem)
 - Ascorbate and glutathione assay: Method of Knorz et al.
 - Stress treatments: paraquat, ethylene, salicylic acid and yeast extract

Results and Discussion

Hydrogen peroxide content in *R. glutinosa* was about 20% of that in soybean. The content was affected by stress treatments but the relative content between the plant species was a little changed. The hydrogen peroxide content showed significant negative correlation with the total antioxidant content in two plant species. Total ascorbate and glutathione contents were similar in two plant species. However, the ascorbate and glutathione contents showed different responses to paraquat treatment in the two plant species. Ascorbate content revealed most contrasting response to paraquat showing little change in *R. glutinos* but drastic decrease in soybean. These results indicate possible role of ascorbate in paraquat tolerance in *R. glutinosa*. This research was supported by a grant from BioGreen21 Program, Rural Development Administration, Republic of Korea.

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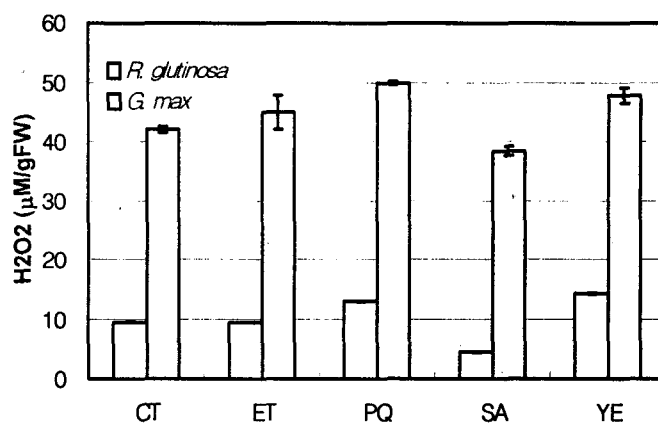


Fig. 1. Contents of the H₂O₂ under various hormone and oxidative stress treatments in *R. glutinosa* and *G. max* L. (C, control; ET, ethylene; PQ, paraquat; SA, salicylic acid; YE, yeast extract).

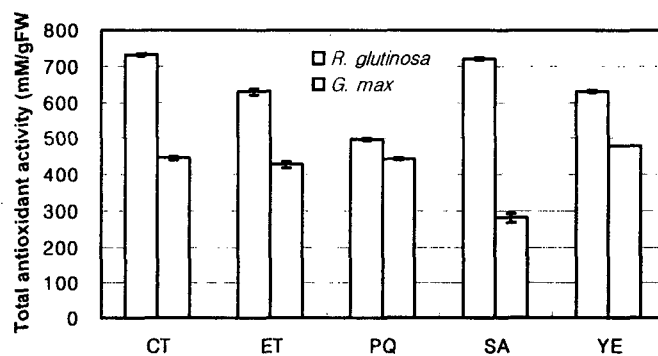


Fig. 2. Total antioxidant contents under various hormone and oxidative stress treatments in *R. glutinosa* and *G. max* L. (C, control; ET, ethylene; PQ, paraquat; SA, salicylic acid; YE, yeast extract).

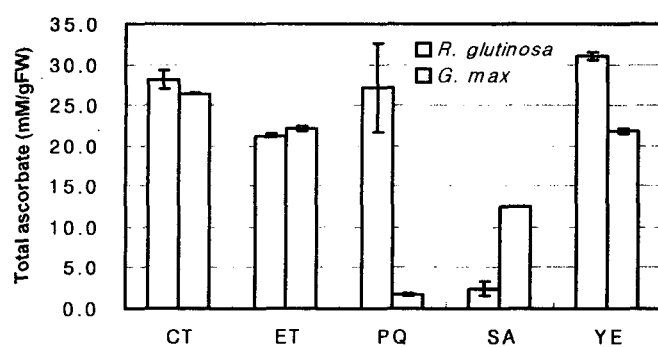


Fig. 3. Total ascorbate contents under various hormone and oxidative stress treatments in *R. glutinosa* and *G. max* L. (C, control; ET, ethylene; PQ, paraquat; SA, salicylic acid; YE, yeast extract).