

Application of Photochemical Analysis to Non-destructive Assessment for Drought Stress in Nursery Seedlings of Cucumber and Tomato Plant

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[Introduction]

The objective of this study is to measure photochemical reactions for rapid diagnosis under drought stress. Some stress indices were quantified following the method by Strasser et al (2010).

[Materials and Methods]

Young nursery seedlings of cucumber (*Cucumis sativa* L.) and tomato (*Lycopersicon esculentum* Mill.) were grown under drought stress for 8 days. The chlorophyll fluorescence reaction were measured for drought stress. Various photochemical reaction processes were assessed and calculated.

[Results and Discussion]

Some photochemical indices applicable to drought stress were selected using non-destructive chlorophyll fluorescence analysis. Tomato and cucumber seedlings grown under drought stress showed to decrease in photosystem II electron transfer efficiency resulting in reduced transfer efficiency of photosystem I electron. As shown in ΔV_{op} change, the electron transfer in photosystem was gradually inhibited. The inhibition of tomato seedlings were processed five days after drought treatment while cucumber seedlings are four days after drought treatment. The most serious reduction index was PI_{ABS} which indicated the photochemical driving force of photosystem II. Five indices were selected as follows; DI_o/RC , $ET2_o/RC$, $RE1_o/RC$, PI_{ABS} and $PI_{total-ABS}$. It could be concluded that tomato seedlings were more drought tolerant than cucumber seedlings on the basis of photochemical assessment.

Keyword : nursery seedling, non destructive assessment, drought stress index, photochemical analysis

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