

# Photochemical Characteristics of Radish (*Raphanus sativus*) Leaf Grown under Different Nitrogen (N) Fertilization

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## Extended Abstract

Radish is a nutritionally balanced vegetable and has a short growing period, so it is cultivated all over the world. [1] Radish, one of the crops with a lot of fertilizer requires a greater amount of nitrogen (N) than phosphorus (P) and potassium (K) during the growing season. [2] Nitrogen is an essential element for plant growth, and it has a high chlorophyll content and productivity enhancement effect in the body, so proper fertilization is required for radish cultivation. [3] [4] In this study, growth health was evaluated by using radish growth investigation and photochemical reaction analysis by nitrogen fertilization level.

Radish was cultivated from September to November 2021 at the farm affiliated with Hankyong University (Anseong-si, Gyeonggi-do). Nitrogen (urea) treatment was performed three times at 5 levels (0kg N ha<sup>-1</sup>, 117kg N ha<sup>-1</sup>, 234kg N ha<sup>-1</sup>, 468kg N ha<sup>-1</sup>, 968kg N ha<sup>-1</sup>) (basis, 1st fertilization, 2nd fertilization), and the control was based on 234kg N ha<sup>-1</sup>. Chlorophyll fluorescence analysis was measured after 30 minutes of dark treatment of leaves using Fluorpen FP-100 (PSI, Czech).

The initial growth rate was delayed in the untreated group (0kg N ha<sup>-1</sup>), and the growth (leaf length, leaf width, live weight above ground and below, etc) was lower than that in the nitrogen-treated group (P<0.05). However, it was confirmed that the increase in the amount of radish growth due to the increase in nitrogen fertilization (468kg N ha<sup>-1</sup>, 968kg N ha<sup>-1</sup>) was not significant.

On the basis of chlorophyll fluorescence analysis, it was confirmed that the photosynthetic system II electron transfer energy flux was reduced under nitrogen deficiency (0, 117kg N ha<sup>-1</sup>) compared to the control. In particular, the photosynthetic system II electron transfer energy flux (ET2o/CS) and photochemical performance index (PI/CS) decreased by 17-57% and 45-85% after the first fertilization, and 28-36% and 56-66% at harvest time. Therefore, it was predicted that the photosynthetic system II electron transfer efficiency and vitality based on the maximum fluorescence amount of radish would decrease in case of nitrogen deficiency, resulting in a decrease in ATP and NADPH production.

In conclusion, it was considered that ET2o/CS and PI/CS could be used as evaluation indicators for radish growth and health in case of nitrogen deficiency.

## Acknowledgements

This research was supported by the Rural Development Administration's (Project No : PJ014206022019) National Academy of Agricultural Sciences Agricultural Science and Technology R&D Project.

## References

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