

PD10) Capsaicinoid and Total free-Sugar Contents Increase in Hot Pepper ‘Muhanjilju’ under Mild High Temperature Regimes

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1. 서론

Hot pepper (*Capsicum annuum* L.) originated from tropical regions requires high temperatures for vegetative growth and fruit development. Favorable temperatures for the growth of hot pepper are in the ranges 25-28°C (day) and 18-22°C (night). Temperatures below 15°C reduce overall plant growth, as well as flowering and fruit set, whereas temperatures above 30°C severely increase small, diseased, or deformed fruit, resulting in low quality fruit. In this study, we investigated the effects of temperature on the vegetative growth, fruit development, fruit yield of hot pepper, etc. and determined the contents of free sugars and capsaicinoids of hot pepper fruit under various temperature regimes.

2. 재료 및 방법

Seeds of hot pepper ‘Muhanjilju’ were sown in 50-cell plug trays filled with commercial bed soil and germinated under natural light and approximately 20/15°C day/night temperatures in a greenhouse. Seventy days after sowing, the seedlings with 8~10 true leaves were transplanted into plastic pots and acclimated for 10 days in chambers controlled to 20°C, and 800 $\mu\text{mol}/\text{m}^2/\text{slight}$ (16h light). Then, ten randomly selected acclimated seedlings were transferred to chambers controlled at different temperature conditions (15°C, 20°C, 25°C, or 30°C). After 80 days under each temperature regimes, morphological and phenological characteristics of fruit attached on the 5th/6th node of the main branch of hot pepper plants were observed during the entire growth period. The free sugars were analyzed using HPAEC-PAD. The capsaicinoids were analyzed using UPLC equipped with an ACQUITY UPLC HSS T3 column.

3. 결과 및 고찰

The temperature range of 20~25°C was favorable for vegetative growth and fruit development. However, a temperature of 30°C reduced fruit development, including fruit set and fruit growth, although it enhanced vegetative growth, and a temperature of 15°C caused short plant height, a small number of branching nodes on the main branch, and elongated fruit. At 20~25°C and 30°C, the fruit development period was shortened by 9~16 and 22 days, respectively, compared with that of plants grown at 15°C. Furthermore, the fruit color change was advanced significantly at 20~25°C and 30°C. Nevertheless, a high temperature of 30°C not only reduced the total number of fruit, but also increased the number of short or malformed fruit. Furthermore, the total free-sugar content of red ripe fruit increased significantly at 20~25°C, and the capsaicinoid content of red ripe fruit increased with the temperature in the range 15~30°C. These results indicate that the temperature range of 20~25°C is favorable for the vegetative growth, fruit development, and fruit quality of hot pepper.

4. 참고문헌

Song, E. Y., Moon, K. H., Son, I. C., Wi, S. H., Kim, C. H., Lim, C. K., Oh, S., 2015, Impact of elevated temperature based on climate change scenarios on growth and fruit quality of red pepper (*Capsicum annuum* L.). Kor J Agri For Meteor, 17(3), 248-253.