E-P-2

Effect of LED Irradiation on Growth Characteristids of Ginseng Cultivated in Plastic Film House

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This experiment was carried out using artificial clay and LED in the plastic film house (irradiation time: 08:00~18:00/day). Seedlings (n = 63 per 3.3 m^2) of ginseng was planted on May 17, 2018. LED was combined with red and blue light in a 3:1 ratio and irradiated with different light intensity. The average air temperature from April to September was 12.3°C-26.0°C and it was the the highest at 26.0°C in August. The test area where fluorescent lamp was irradiated tended to be somewhat higher than the LED irradiation area. The chemical properties of the test soil are as follows. pH levels was 5.3~5.5, EC levels 0.45~0.52 dS/m and OM levels 33~37%. The total nitrogen content was 0.35~0.47% and the available P_2O_5 contents was 13.7~16.0 mg/kg, which was lower than the suitable level of 70~200 mg/kg. Exchangeable cations K and Mg contents were within acceptable ranges, but the Ca contents was 28~38 $cmol^+$/kg levels higher than the permissible level (2~6 $cmol^+$/kg). Germination of ginseng leaves took 8~9 days and the overall germination rate was 70~75%. The photometric characteristics of LED light intensity are as follows. The greater the light intensity, the higher the PAR (Photosynthetic Action Radiation) value, illuminance and solar irradiation. Photosynthetic rate was also increased with higher light intensity was investigated at 1.7~3.2 μmol $CO_2/m^2/s$. Leaf temperature (23.7~24.8°C) by light intensity was the same trend. The growth of aerial parts (plant height etc.) were generally excellent when irradiated with 3 times the light intensity, the growth of the ginseng aerial parts were excellent as follows. The plant height was 42.6 cm, stem length was 25.2 cm, leaf length was 9.6 cm and stem diameter was 5.0 mm. The growth of underground part (root length etc.) was the same, and the root length was 24.4 cm, the tap root length was 6.0 cm, diameter of taproot was 18.2 mm and the fresh root weight was 17.2 g. There were no disease incidence such as Alternaria blight, Gray mold and Anthracnose. Disease of Damping off occurred 2.2~3.6% and incidence ratio of rusty root ginseng was 14.6~20.7%. Leaf discoloration rate was 13.7~48.9% and increased with increasing light intensity. Ginsenoside content of ginseng by light intensity is under analysis.

Key words: Ginseng, LED, Plastic film house, Light intensity

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