

Effect of Soluble-silicate or Chitosan Foliar Spray on Ginseng Cultivated in Blue-white Plastic Film House

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The experiments were performed in the Jinan (elevation: 300 meters above sea level), Jeollabuk-do. Seedlings (n = 63 per 3.3 m²) of ginseng cultivar (Cheonpung, Yeonpung) were planted on April 10, 2015. Shading material of plastic film house was blue-white film. Before the Planting seedling, silicate (3 kg/10 a) or chitosan (40 kg/10 a) was fertilized and foliar sprayed on the leaves 1000 times dilution solution once a month from May to September every year. The growth results of 5-year old ginseng surveyed in 2018 are as follows. The average air temperature in the plastic film house was the highest at 26.6°C and 26.5°C in July and August, respectively, and the highest temperature was 40.5°C in July. The maximum daily temperature of 35°C or more was 30 days, with the average soil temperature being 24.9°C in August. The chemical properties of the test soil are as follows. pH was 6.4~6.9 level and EC was 0.35~0.46 dS/m. The organic matter content was 33.5~41.4 g/kg, and available-P content was 251.9~306.8 mg/kg. Exchangeable cations contents, such as K, Ca and Mg were all the appropriate ranges. The soil microbial density surveyed by the dilution plate method was 10~50 times higher than that of control (Non-treatment) and actinomycete density was 3~6 times higher. Pathogens of the genus *Fusarium* by Metagenome analysis decreased 91.3% and 68.2% respectively in the foliar sprayed of chitosan and soluble-silicate. The light intensity (PAR) in the blue-white film plastic film house gradually increased until July and then decreased, with the average of light intensity in March-October was 120.3 umol/m²/s. The growth of aerial parts such as plant height and stem length was better than non-sprayed group in silicate or chitosan treatments and Yeonpung cultivar was superior to the Cheonpung cultivar. The SPAD value was higher in Yeonpung cultivar foliar sprayed with soluble-silicate. The growth of underground parts such as root length and taproot length were better in chitosan and soluble-silicate treatment than control, especially in Yeonpung cultivar foliar sprayed with chitosan was good in taproot length and taproot diameter, and fresh weight of root was 60.1 g. Ginsenoside contents were 24.9 mg/g and 22.4 mg/g, in the Cheonpung cultivar foliar sprayed with soluble-silicate or chitosan respectively, 28% and 15% higher than control (19.5 mg/g). The incidence of disease by *Alteraria panax* and *Botrytis cinerea* was 3~9% and 4~9%, respectively. High temperature damage rate was 3~5%.

Key words: Ginseng, Blue-white plastic film house, Soluble-silicate, Chitosan, Ginsenoside

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