Effect of different growth media on number of minitubers and concentration of elements in potato (*Solanum tuberosum* L) shoot and root

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Abstract

Potato (*Solanum tuberosum* L.) is one of the most important economical vegetable. Minitubers are small seed tubers without pathogens that are produced from invitro plantlets after translocation to greenhouse and create healthy and high quality seed tubers. Hydroponic systems increase the production of virus-free potato minitubers. This research was carried out to study the effect of different growth media on number of minitubers and concentration of elements in potato shoot and root and also to compare the hydroponic culture and soil containing media in a randomized complete blocks design with 8 treatments and 4 replications. The treatments consisted of: 1) perlite, 2) perlite + vermiculite (1:1 v/v), 3) perlite + peat moss (1:1 v/v), 4) perlite + soil (1:1 v/v), 5) perlite + soil + compost (40:30:30), 6) perlite + soil + vermicompost (40:30:30), 7) soil, and 8) perlite + peat moss (control). At the end of growth period, the number of tuber per plant and concentration of elements (N, P, K, Na, and Ca) in roots and shoots were measured. Results of analysis of variance showed that bulk density, particle density, porosity, EC and pH of different growth media were significantly different ($P<0.01$). The soil medium had the highest bulk density (1.23 g/cm^3), the highest particle density (2.44 g/cm^3), the highest EC and pH and the lowest porosity (50%). Therefore, this treatment produced the lowest number of tubers per pot. The maximum concentration of N, P and K in potato shoot and root were in perlite + soil + vermicompost and soil + compost + perlite media. The maximum concentration of Ca in potato shoot was in perlite + soil medium (1.68 mg/g dw). The maximum concentration of Na in potato shoot was in soil + compost + perlite medium (0.35 mg/g dw). Number of minitubers and plantlets' growth in soilless media (hydroponics) were higher than soil media. There were significant correlations between the concentration of elements in root and shoot with the properties of cultivation media. The perlite + peat moss medium (1:1 v/v) is recommended for hydroponics production of potato minitubers.

Keywords: Hydroponics, Growth media, Peat moss, Potato, Minituber.

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