Application of Light-emitting Diode (LED) on in vitro Chrysanthemum morifolium Quality Improvement

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With the aim of studying the possibility of using LED lighting sources on in vitro Chrysanthemum morifolium propagation instead of the light of fluorescent lamps, we have carried out various experiments. In this project, the effects of different LED lighting sources and ratios (red LED/blue LED) on the shoot regeneration, shoot multiplication, growth and development of in vitro Chrysanthemum morifolium; its survival, growth and development rate in greenhouse were investigated. Chrysanthemum morifolium leaves and stems were cultured under different lighting conditions, such as fluorescent lamp, red, blue, yellow, green and white LED; red and blue LED in combination. After 4 weeks of culture, the results indicated the best lighting condition for shoot regeneration was 70R:30B ratio. For shoot multiplication, the combination of 50R:50B ratio gave the highest number of shoots/explant. Lighting with ratio 70R:30B ratio also gave the best results. In addition, the highest contents of chlorophyll a and chlorophyll b were obtained under 70R:30B ratio. Intensity 60 µmol.m-2.s-1 gave better results on growth and development of in vitro Chrysanthemum morifolium. The most suitable LED lighting period for growth and development of in vitro Chrysanthemum were the weekly intermittent lighting of blue LED and red LED (blue LED lighting for the first week) with highest fresh weight, dry weight, length and width of leaf, number of roots. The survival rate, growth and development of in vitro Chrysanthemum lighted with ratio 70% red LED and 30% blue LED were the best in greenhouse. In conclusion, it is possible to replace the fluorescent lamps with LED lighting sources on in vitro Chrysanthemum morifolium propagation.

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