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"Gheorghe Asachi" Technical University of Iasi, Romania

ANTIVIRAL ACTIVITY OF *Oliveria decumbens* Vent. ESSENTIAL OIL ENCAPSULATED IN CHITOSAN NANOPARTICLES TO CONTROL CUCUMBER MOSAIC VIRUS

Mohamad Hamed Ghodoum Parizipour[1]*, Amir Ghaffar Shahriari[2], Yaser Biniaz[3], Aminallah Tahmasebi[4]

[1]Department of Plant Protection, Faculty of Agriculture, Agricultural Sciences and Natural Resources University of Khuzestan, Mollasani, Iran
[2]Department of Agriculture and Natural Resources, Higher Education Center of Eghlid, Eghlid, Iran
[3]Plant Virology Research Center, Shiraz University, Shiraz, Iran
[4]Department of Agriculture, Minab Higher Education Center, University of Hormozgan, Bandar Abbas, Iran

Abstract

Plant-derived bioactive compounds have been extensively used as green and environmentally-friendly agents against viral infections in plants. *Oliveria decumbens* Vent. is a medicinal plant traditionally used in Iranian medicine for the treatment of various infections. Herein, the essential oil (EO) of *O. decumbens* was extracted and microencapsulated in chitosan nanoparticles to evaluate its activity against the Me isolate of cucumber mosaic virus (CMV-Me). The particles were co-, pre-, and post-treated on leaves of *Chenopodium quinoa* and *Nicotiana tabacum* cv. Turkish plants challenged with CMV. To determine the possible physiological and biochemical changes, plant growth indices including fresh and dry weight, height, chlorophyll content, and the activity of defense-related enzymes viz. peroxidase (POD) and phenylalanine ammonia-lyase (PAL) were measured. The results showed that pre-treatment of the plants with *O. decumbens* EO encapsulated in chitosan nanoparticles significantly inhibited the development of local lesions in *C. quinoa* and infection rate in *N. tabacum* cv. Turkish CMV-challenged plants, respectively. Moreover, the biological indices of pre-treated *N. tabacum* cv. Turkish plants were found to be more than those of non-treated plants challenged with CMV. Also, a significant increase was observed in POD and PAL content within pre-treated *N. tabacum* cv. Turkish plants showing the possible antiviral induced resistance mechanism of encapsulated EO from *O. decumbens* in chitosan nanoparticles. These findings suggest that the reformulation of EO from *O. decumbens* is a promising biologically active source to control CMV infection in plants.

Key words: bioactive compound, medicinal plant, microencapsulation, resistance, virus

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* Author to whom all correspondence should be addressed: e-mail: parizi@asnrukh.ac.ir; Phone: +98 6136524331; Fax: +98 6136522425