

BIOLOGICAL AND PHYLOGENETIC STUDY OF *Cauliflower mosaic virus* ON CANOLA IN IRAN *

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Abstract

Cauliflower mosaic virus (CaMV) causes yield losses in plants of Brassicaceae family including canola (*Brassica napus*). In order to detect CaMV in canola, a total of 684 leaf samples showing various virus-like symptoms were collected in several provinces of Iran including Tehran, Ghazvin, Chaharmahal-Bakhtiari, Mazandaran, Ardabil, West Azarbajejan and Fars provinces. Using a polyclonal antiserum and DAS-ELISA method, samples were tested for the presence of CaMV. ELISA positive isolates from 7 provinces, were used for further studies. Biological diversity of CaMV isolates was evaluated by their ability to infect turnip, kohlrabi and datura. All isolates under study infected turnip, producing local lesions of different sizes and timing, whereas, no symptom was observed on kohlrabi and datura. Specific primers amplified an 840 bp fragment of ORF V. Phylogenetic analysis grouped all Iranian isolates and two GenBank isolates (Cabb-D/H, M10376, Xinjiang, AF140604) in one cluster, while all other CaMV isolates from GenBank formed a separate cluster.

Keywords: Canola, *Cauliflower mosaic virus*, ORF V, Phylogeny, Canola viruses.

See Persian text for figures and tables (Pages ۹۳-۹۹).

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References

- AL-KAFF, N. S. and COVEY, S. N. 1995. Biological diversity of *Cauliflower mosaic virus* isolates expressed in two *Brassica* species. **Plant Pathol.** 44 (3): 516–526.
- BRODBENT, L. and TINSLEY, T. W. 1953. Symptoms of *Cauliflower mosaic virus* and *cabbage black ring spot* in Cauliflower. **Plant Pathol.** 2 (3): 88-92.
- Chenault, K. D. and Melcher, U. 1994. Phylogenetic relationships reveal recombination among isolates of *cauliflower mosaic virus*. **J. Mol. Evol.** 39 (5): 496-505.
- CLARK, M. F. and ADAMS, A. N. 1977. Characterization of a microplate method of enzyme-linked immunosorbent assay for the detection of plant viruses. **J. Gen. Virol.** 34:475- 483.
- COVEY, S. N., TURNER, D. S., LUCY, A. P. and SAUNDER, K. 1990. Host regulation of the *cauliflower mosaic virus* multiplication cycle. **Proc. Natl. Acad. Sci. USA** 87: 1633-1637.
- DELLAPORTA, S. L., WOOD, J. and HICKS, J. B. 1983. A plant DNA mini preparation. **Plant Mol. Biol. Rep.** 1:19-20.
- FAO, 2008. FAOstat database results from FAO web site: **Food and Agriculture Organization of the United Nations.** [www. apps.fao.org](http://www.apps.fao.org).
- FARZADFAR, Sh., AHOONMANESH, A., MOSAHEBI, G. H., OSHIMA, K., KOOHI-HABIBI, M., POURRAHIM, R. and GOLNARAGHI, A. R. 2007. Partial biological and molecular characterization of *cauliflower mosaic virus* isolates in Iran. **Plant Pathol. J.** 6 (4): 291-298.
- HARDWICK, N. V., DAVIES, J. M. L. and WRIGHT, D. M. 1994. The incidence of three virus diseases of winter oilseed rape in England and Wales in the 1991, 1992 and 1993 growing season. **Plant Pathol.** 43(6): 1040-1049.
- KOLTE, S. J. 1985. **Rapeseed in: Diseases of Annual Edible Oilseed Crops.** Vol. II, CRC Press. 135 PP.
- SAUNDERS, K., LUCY, A. P. and COVEY, S. N. 1990. Susceptibility of Brassica species to *cauliflower mosaic virus* infection is related to a specific stage in the virus multiplication cycle. **J. Gen. Virol.** 71: 1641-1647.
- SHAHRAEEN, N., FARZADFAR, Sh. and LESEMANN, D. E. 2003. Incidence of viruses infecting winter oilseed rape (*Brassica napus* ssp. *olegera*) in Iran. **J. Phytopathol.** 151: 614-616.
- SHARYATI, S. and GHAZI SHAHNI-ZADE, P. 2000. **Canola.** Nashr-e-Amoozesh Keshavarzi Press. 81p.
- SUTIC, D.D., FORD, R. E. and TOSIC, M. T. 1999. **Handbook of Plant Virus Diseases.** CRC Press, Boca Raton, Florida, USA, 553p.
- WALSH, J. A. and TOMLINSON, J. A. 1985. Viruses infecting winter oilseed rape (*Brassica napus* ssp. *Olifera*). **Ann. Appl. Biol.** 107: 485-495.