Cymbidium mosaic virus and odontoglossum ringspot tobamovirus genes cloned from infected Oncidium orchids

ABSTRACT

Several recombinant phages were picked at random from the cDNA library of Oncidium (Oncidium Goldiana x Oncidium Flexuosum) flowers, converted into plasmids by in vivo excision and sequenced. Two of the clones named CyMV1 and CyMV2, showed very high DNA and protein sequence homology to those of the cymbidium mosaic virus (CyMV) in the genebank database. CyMV1, 1,186 bp in size, contained within it the entire sequence for coat protein (CP) gene, movement protein (MP)3 gene and an almost complete sequence for MP2 gene. CyMV2, which is 626 bp in size, only contained the extreme 3ô end sequence of the RNA polymerase gene. The percentage of homology of the isolated CyMV1 gene was 97% to the Taiwanese strain (AY571289), 96% to the Korean type 2 CyMV complete genome (AF016914) and to the Singaporean CyMV complete genome (CMU62963) in the CP and MP regions of the genome. CyMV2 showed 95% homology to the Korean type 2 CyMV complete genome (AF016914) and to the Singaporean CyMV complete genome (CMU62963) but in the RNA polymerase region. Another clone named ORSV1, 728 bp in size, isolated by RT-PCR method was a partial fragment of odontoglossum ringspot virus (ORSV) RNA replicase gene. This partial gene sequence of ORSV1 showed 98% homology to the ORSV gene isolated from United States (Accession nos. ORU89894), Taiwan (Accession nos. AY571290) and Korea (Accession nos. X82130). All of these genes could be used in developing Oncidium orchids resistant to CyMV or ORSV through the transgenic approach.

Keyword: Coat protein gene; Cymbidium mosaic virus; Odontoglossum ringspot tobamovirus; Oncidium Goldiana x Oncidium Flexuosum; Genetic engineering