

**PCR- based Detection and Characterization of Candidate Disease Resistant Gene Analogous (RGAs) in Commercially Grown Capsicum Varieties in Sri Lanka**

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Identification of R gene homologous from chilli (*Capsicum annuum* L.) will provide important information for improving disease resistance in breeding programs. A Nucleotide-Binding Site (NBS) domain in R gene family accounts for the largest number of disease resistant genes in plants. In this study it was aimed at detecting the presence of putative disease resistant genes in commercially growing chilli varieties; MI Hot, MI 02, MICHHY1, MICH3, KA 02, Arunalu, Hen miris using a specifically designed primer pair in a PCR-based approach. The PCR amplified gene products were sequenced and homologies were explored in BLASTn. A sequence identity matrix was constructed using these nucleotide sequences of the chilli varieties along with 5 similar homologous sequences obtained from in Cluster W programme of Bio-Edit (version 8.0). Phylogenetic analysis was performed in MEGA X. The similarity between the tested nucleotide sequences of 07 chilli varieties showed more than 90% similarity with each other except the accession, MICH3. Sequence analysis indicated that the identified partial Resistance Gene Analogous (RGA) belong to the NBS–LRR type, which they gave more similar matching with the RGAs identified in other plant species reported from previous studies; more than 85% with *C. annuum* (XM 016690560), 70% with *Solanum pennellii*; (XM015201323,) *Solanum lycopersicum* (XM026028184), *Camellia sinensis*; (XM028216350) and *Sesamum indicum*; (XM011072521) available in the GenBank<sup>®</sup>, suggesting the existence of common ancestors. The study reveals that the candidate R gene nucleotide sequences of tested chilli accessions have a close relation to RGAs found in *Solanum peennellii* and *Solanum lycopersium*. However, gradual alteration found in the generated nucleotide sequences may lead to loss of resistance in target gene action for diseases in chilli. Identified partial RGA nucleotide sequences found in this study are supposed to be located on 11<sup>th</sup> chromosome due to the location of similar RGAs. The information generated in this study is useful for making combinations of possible crosses for generating genetic resistance in chilli for biotic stresses and these RGAs could be regarded as candidate sequences of resistant genes for marker development. This is the first investigation report of NBS family RGAs in Sri Lankan *Capsicum* germplasm.

**Key words:** *Capsicum annuum*, Disease resistance, Resistance Gene Analogous