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In silico characterization of EPR family proteins in Solanaceous vegetable crops

Shailesh Kumar Tiwari¹, Mahesh Kumar Basantani², Divya Gupta² and Rajesh Mehrotra³

¹ICAR-Indian Institute of Vegetable Research, India

²Shri Ramswaroop Memorial University, India

³Birla Institute of Technology and Science, India

Eicosapenta Peptide Repeats (EPRs) proteins are tandem peptide repeats constituting a peptide repeat sequence family with a unique 25 aminoacid repeat unit of X₂CX₄CX₁₀CX₂HGGG, repeated multiple times and are known only in flowering plants. These non-enzymatic proteins are predicted to be located in the chloroplast and possibly play a role in gene expression and regulation. Further, these may function as a domain in addition to being a full assembly. We conducted an *in silico* analysis of this important, but unexplored, protein family in three vegetable crops *viz* tomato, capsicum and brinjal. The published genome sequences of tomato, capsicum and brinjal were searched for the presence of EPR homologues. We identified 3 putative EPRs each in brinjal and tomato genomes, and 2 EPRs in capsicum genome. The aminoacid sequence comparison of these with the published *Arabidopsis thaliana* and rice EPRs revealed that brinjal, tomato and capsicum proteins also contain the same conserved sequences multiple times. Interestingly, the brinjal amino acid sequences were similar to tomato EPRs and *A. thaliana* WRKY transcription factors. High conservation combined with narrow phylogenetic specificity of EPRs observed in this study also supports the putative role of EPRs in crop evolution and/or may have significant role in gene function. The current work is a significant step towards the identification of EPR proteins in important vegetable crops. This study also paves the way for a better understanding of the functional relevance of EPR proteins, and helps scrutinize the overlapping functions performed by these proteins in diverse plant species.

tiwarishailu@gmail.com