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Purification & characterization of polygalacturonase-inhibitory proteins from *Saccharum officinarum* Linn. Leaves

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Pectin is an important component in plant cell walls, and it is especially prevalent in primary cell walls and the middle lamellae. The importance of pectin for plant tissue architecture and cell integrity was illustrated by expressing pectinolytic enzymes of fungal origin in plants. Only transgenic plants containing low levels of enzyme activity could be recovered, presumably because high expression is lethal. A wide variety of bio trophic and necrotrophic plant-pathogenic fungi produce pectinolytic enzymes during infection of their hosts. Production of these enzymes facilitates the hydrolysis of pectin, paving the way for the pathogen to colonize the host tissue while, at the same time, providing products of pectin degradation which serve as nutrients. These enzymes, produced in pure form in a heterologous system, are able to cause rapid and massive maceration and tissue collapse when infiltrated in leaves of several plant species. Plants have developed a mechanism to counteract the action of PGs by expressing proteins known as polygalacturonase inhibiting proteins (PGIPs) that inhibit the activity of fungal PGs. These proteins are considered to contribute to resistance against pectinase-producing pathogenic fungi. PGIPs typically are cell wall bound, tissue specific, developmentally regulated, and inducible by various stimuli, including pathogen attack, wounding, salicylic acid, jasmonic acid, oligogalacturonides (OGAs), and cold treatment. The functional importance of PGIPs in plants is corroborated by the observation that PGIP genes are under positive evolutionary selection. Thus, the inhibition of fungal PGs by PGIP may slow down infection by limiting cell wall hydrolysis and maceration and, in doing so; allow time to activate multiple defense responses to counteract the pathogen. Both these properties have generated an interest in exploiting PGIPs as tools for enhancing plant resistance on. In this study, we show that VvPGIP1 (PGIPgene) quantitatively reduces the symptoms caused by fungus in plant. Surprisingly, in vitro studies could not provide any indication that the two proteins in pure form could interact under the conditions tested. The results suggest a complex in vivo interaction between the protein pair tested.

Biography

Parthasarathi Das has completed B.Tech in Biotechnology from Bharath University, Selaiyur Chennai-73 in the year 2009. He is currently pursuing M.Tech in Biotechnology at Fakir Mohan University, Balasore, Odisha.