

Insect Inducible Methanol Production in Plants for Insect Resistance

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Abstract : Plant cell wall plays a major role in defence mechanism against biotic and abiotic stress as it constitutes the physical barrier between the microenvironment and internal component of the cell. It is a complex structure composed of mostly carbohydrates among which cellulose and hemicelluloses are most abundant that is embedded in a matrix of pectins and proteins. Multiple enzymes have been reported which plays a vital role in cell wall modification, Pectin Methylesterase (PME) is one of them which catalyses the demethylesterification of homogalacturonans component of pectin which releases acidic pectin and methanol. As emitted methanol is toxic to the insect pest, we use PME gene for the better methanol production. In the current study we showed overexpression of PME gene isolated from *Withania somnifera* under the insect inducible promoter causes enhancement of methanol production at the time of insect feeds to plants, and that provides better insect resistance property. We found that the 85-90% mortality causes by transgenic tobacco in both chewing (*Spodoptera litura* larvae and *Helicoverpa armigera*) and sap-sucking (Aphid, mealybug, and whitefly) pest. The methanol content and emission level were also enhanced by 10-15 folds at different inducible time point interval (15min, 30min, 45min, 60min) which would be analysed by Purpald/Alcohol Oxidase method.

Keywords : methanol, Pectin methylesterase, inducible promoters, Purpald/Alcohol oxidase

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