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Transformation of ectA Gene From Halomonas elongata in Tomato Plant

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Abstract : Salinity is one of the major threats to world food security. Considering the requirement for salt tolerant crop plants in the present study was undertaken to clone and transferred the salt tolerant ectA gene from marine ecosystem into agriculture crop system to impart salinity tolerance. Ectoine is the compatible solute which accumulates in the cell membrane, is known to be involved in salt tolerance activity in most of the Halophiles. The present situation is insisting to development of salt tolerant transgenic lines to combat abiotic stress. In this background, the investigation was conducted to develop transgenic tomato lines by cloning and transferring of ectA gene is an ectoine derivative capable of enzymatic action for the production of acetyl-diaminobutyric acid. The gene ectA is involved in maintaining the osmotic balance of plants. The PCR amplified ectA gene (579bp) was cloned into T/A cloning vector (pTZ57R/T). The construct pDBJ26 containing ectA gene was sequenced by using gene specific forward and reverse primers. Sequence was analyzed using BLAST algorithm to check similarity of ectA gene with other isolates. Highest homology of 99.66 per cent was found with ectA gene sequences of isolates Halomonas elongata with the available sequence information in NCBI database. The ectA gene was further sub cloned into pRI101-AN plant expression vector and transferred into E. coli DH5α for its maintenance. Further pDNM27 was mobilized into A. tumefaciens LBA4404 through tri-parental mating system. The recombinant Agrobacterium containing pDNM27 was transferred into tomato plants through In planta plant transformation method. Out of 300 seedlings, co-cultivated only twenty-seven plants were able to well establish under the greenhouse condition. Among twenty-seven transformants only twelve plants showed amplification with gene specific primers. Further work must be extended to evaluate the transformants at T1 and T2 generations for ectoine accumulation, salinity tolerance, plant growth and development and yield.

Keywords : salinity, computable solutes, ectA, transgenic, in planta transformation
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