Salt Tolerance of Potato: Genetically Engineered with Atriplex canescens BADH Gene Driven by 3 Copies of CAMV35s Promoter

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Abstract : Potato (Solanum tuberosum L.) is ranked among the top leading staple foods in the world. Salinity adversely affects potato crop yield and quality. Therefore, increased level of salt tolerance is a key factor to ensure high yield. The present study focused on the Agrobacterium-mediated transformation of Atriplex canescens betaine aldehyde dehydrogenase (BADH) gene, using single, double and triple CAMV35s promoter to improve salt tolerance in potato. Detection of seven potato lines harboring BADH gene, followed by identification of T-DNA insertions, determination of transgenes copies no through Southern Hybridization and quantification of BADH protein through Enzyme Linked Immunosorbent Assay were considered in this study. The results clearly depict that the salt tolerance of potato was found to be promoter-dependent, as the potato transgenic lines with triple promoter showed 4.4 times more glycine betaine production which consequently leads towards high resistance to salt stress as compared to transgenic potato lines have also shown lower levels of H2O2, malondialdehyde (MDA), relative electrical conductivity, high proline and chlorophyll content as compared other two lines having a single and double promoter. Insilco analysis also confirmed that Atriplex canescens BADH has the tendency to interact with sodium ions and water molecules. Taken together these facts it can be concluded that over-expression of BADH under triple CAMV35s promoter with more glycine betaine, chlorophyll & MDA contents, high relative quantities of other metabolites results in an enhanced level of salt tolerance in potato.

Keywords : Atriplex canescens, BADH, CAMV35s promotor, potato, Solanum tubersum Conference Title : ICPA 2017 : International Conference on Plants Agriculture Conference Location : Paris, France Conference Dates : February 23-24, 2017

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