

## Executive Summary

# Transformation of *Balanites aegyptiaca* into a Salt Tolerant Plant

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*Balanites aegyptiaca* is a highly drought-tolerant but salt-sensitive tree and generally known as desert date. This tree is rich in oil contents and can be potentially used for biodiesel production<sup>1</sup>. Moreover, numerous parts of this plant possess biological activities, including antibacterial, anti-cancer as well as antifungal activities which indicate existence of a variety of secondary metabolites<sup>1,2</sup>.

As, this plant is a salt susceptible plant; therefore, due to this fact overall productivity of this tree gets affected. It is reported that salt stress affects 800 million hectares of agricultural land globally<sup>3</sup>. Moreover, salt stress at high levels of 24 dS m<sup>-1</sup> drastically affects the seedling growth<sup>4</sup>.

However, for the first time, Khamis *et al.*<sup>5</sup> reported the transformation of this tree by employing 3 different *Agrobacterium tumefaciens* strains including EHA105, GV3101 and LBA4404 as well as pCAMBIA2301 plasmid containing the *nptII* marker and *gus* reporter genes. In this experiment, strain GV3101 exhibited the maximum transformation effectiveness. Moreover, this protocol transferred the *ERD10* gene present in *B. aegyptiaca*, ultimately producing a salt tolerant transformed plant.

Therefore, a new study was designed to investigate the effect of the genotypic variation in *B. aegyptiaca* plants by employing *Agrobacterium tumefaciens* strain GV3101 containing the pBinAR vector harboring *ERD10* (Early Responsive to Dehydration 10) and *nptII* genes, to develop a salt-tolerant plants<sup>6</sup>.

The outcomes of this study emphasized the effect of the genotypic variation of the tested plant on the efficiency of the genetic transformation process. Though, detailed research is needed to investigate the expression of the transformed genes as well as the capability of the transformed plant to survive under different salinity levels.

Conclusively, this experiment can assist the production of salt-tolerant plants which can be grown in arid and semi-arid lands. Moreover, it may also enable the biotechnological industries to produce biodiesel in order to meet with the ever growing demand of fuel.

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