

New genetically engineered peanuts resistant to pests, diseases

Peanut (*Arachis hypogaea* L.) is a major species of the family, Leguminosae, and economically important not only for vegetable oil but as a source of proteins, minerals and vitamins. It is widely grown in the semi-arid tropics and plays a role in the world agricultural economy. Peanut production and productivity is constrained by several biotic (insect pests and diseases) and abiotic (drought, salinity, water logging and temperature aberrations) stresses, as a result of which crop experiences serious economic losses. Genetic engineering techniques such as *Agrobacterium tumefaciens* and DNA-bombardment-mediated transformation are used as powerful tools to complement conventional breeding and expedite peanut improvement by the introduction of agronomically useful traits in high-yield background.

To develop transgenic plants withstanding major abiotic stresses, genes coding transcription factors for drought and salinity, cytokinin biosynthesis, nucleic acid processing, ion antiporter and human antiapoptotic have been used. Moreover, peanut has also been used in vaccine production for the control of several animal diseases. In addition to above, this study also presents a comprehensive account on the influence of some important factors on peanut genetic engineering. Future research thrusts not only suggest the use of different approaches for higher expression of transgene(s) but also provide a way forward for the improvement of crops.

In view of increasing importance for enhancing the production and productivity of peanut, newer challenges are encountered for a sustainable peanut cultivation in the next millennium. The success of transformation in peanut is still inadequate due to its genotype, explants and protocol dependency. Moreover, focused and intensified research warrants efforts to develop genotype independent approaches for obtaining stable in vitro genetic transformants.

Newly emerged targeted genome editing technology of functional genes promises to be a powerful tool in accelerating varietal improvement of plants. These emerging technologies have dramatically expanded the ability to manipulate genome not only in monocots but also in dicotyledonous plant system, and thus, genome editing technologies provide a promising hope for further peanut improvement.

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