

Bacteriophage T7 RNA polymerase-directed, inducible and tissue-specific over-expression of foreign genes in transgenic plants Huu Tam Nguyen , Sadhu Leelavathi and Vanga Siva Reddy

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Summary

A widely applicable bacteriophage T7 RNA polymerase-directed, tissue-specific and inducible over-expression of foreign genes in transgenic plants was developed. This was achieved through the simultaneous transformation of a modified T7 RNA polymerase to specifically transcribe the foreign gene placed under the control of T7 expression signals. The T7 RNA polymerase recognized the chimeric *uidA* gene integrated randomly into tobacco and rice genomes. Results from the use of six different promoters with different tissue specificities indicated that the recombinant protein was expressed at a several-fold (3–10-fold) higher level when compared with transgenes expressed directly under the control of these tissue-specific promoters. An important feature of the T7 system in plants was the near-uniform expression in the independently transformed plants, in contrast with the large variations observed in transgene expression under the direct control of plant promoters. In addition, our results demonstrated the application of the T7 system in the regulation of transgene expression through chemically inducible mechanisms. This versatility of controlled and regulated expression offers a powerful tool that could be used in various programmes in plant biotechnology and genomic studies.

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