

ROLE OF BACTERIAL STRAIN IN DETERMINING THE EFFICIENCY OF GENETIC TRANSFORMATION IN *HEVEA BRASILIENSIS*

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Genetic transformation offers a viable approach in *Hevea brasiliensis* for crop improvement by adding valuable genes for specific characters in a relatively short period. 3-Hydroxy 3-methylglutaryl Coenzyme A reductase (HMGR) is considered as a key enzyme in the rubber biosynthetic pathway. With a view to increase the yield potential in *Hevea*, attempts were made to over-express this rate limiting enzyme by *Agrobacterium tumefaciens* mediated genetic transformation. Selection of an appropriate bacterial strain is one of the key parameters required for an efficient genetic transformation system. To identify a suitable bacterial strain giving maximum transformation efficiency with the *hmgR1* gene in *Hevea*, three *Agrobacterium* strains (EHA 105, LBA4404 and pGV 1301) harbouring the transgene were experimented. The binary vector contained hygromycin phosphotransferase gene (*hpt*) as the plant selectable marker. The effect of different explants (primary callus, embryogenic callus and embryogenic suspension cultures) as well as co-cultivation temperature on transformation efficiency was evaluated. Highest transformation efficiency was observed with the strain EHA 105, irrespective of the target tissues tried for transformation. Low temperature incubation (20 °C) of the infected tissues during co-cultivation period improved the frequency of transformation. Among the different target tissues tried, embryogenic suspension cultures gave the maximum number of transgenic cell lines (32%). The presence of the transgene was confirmed in the transgenic cell lines by PCR using gene specific primers.

Keywords: *Agrobacterium tumefaciens*, Embryogenic suspension cultures, Genetic transformation

INTRODUCTION

The ultimate objective of breeding in natural rubber includes the development of superior clones with increased dry rubber yield. As *Hevea* clones cultivated in the south Asian countries originated from a small

number of plant sources collected by Wickham, the genetic diversity is rather limited (Dijkman, 1951). Controlled hybridization allowed an increase in the latex yield of recommended clones to 2000 to 3000 kg/ha¹yr¹ during 1980's (Omokhafa