EMBRYOGENIC COMPETENCE AND *HbSERK* GENE EXPRESSION DURING SOMATIC EMBRYOGENESIS

P. Kumari Jayasree, Sajeena Saseendran and Suni Annie Mathew

Rubber Research Institute of India, Kottayam-686 009, Kerala, India

Received: 04 January 2017 Accepted: 13 March 2017

Jayasree, P.K., Saseendran, S. and Mathew, S.A. (2017). Embryogenic competence and *HbSERK* gene expression during somatic embryogenesis. *Rubber Science*, **30**(1): 76-81.

Unlike zygotic embryogenesis, during somatic embryogenesis an induction phase is required where differentiated somatic cells acquire embryogenic potential. The transition of somatic cells to embryogenic phase is the first and crucial step in somatic embryogenesis. This process involves reprogramming of gene expression patterns as well as changes in the morphology, physiology and metabolism. These changes are dependent on the up and down regulation of certain genes which are essential for the transition. Although the mechanism is still unclear, the search for such genes led to the discovery of *SERK* gene. The objective of the present study is to determine the expression pattern of the *HbSERK* gene during the transition of somatic cells to the embryogenic state. In RT-PCR assay, no *SERK* transcripts could be detected in somatic callus before embryo induction. However, the *SERK* expression was restricted in embryogenic cells. Regarding the *HbSERK* expression in other tissues, no signal was found either in leaves or in non-embryogenic callus, but was observed in emerging shoot. Thus the present study demonstrated that in addition to the acquisition of embryogenic competence, *SERK* gene also plays a role in shoot organogenesis in *Hevea*.

Key words: Embryogenic competence, Expression phase, Induction phase, *SERK* gene expression

Plant somatic cells under favorable *in vitro* conditions acquire embryogenic competence and later get converted into embryos, which is the basis of somatic embryogenesis. These embryos after passing through a series of developmental stages result in the production of whole plants. Somatic embryogenesis pathway has close resemblance with zygotic embryogenesis. However, unlike zygotic embryogenesis which is intrinsically embryogenic, most of the somatic cells are not naturally embryogenic and hence an induction phase is required for the somatic cells to acquire embryogenic competence (Dodeman *et al*., 1997). The induction phase, when the transition of somatic into embryogenic cells has occurrs, is the first and most critical step and is a complex process and this process in plant cells remain largely unknown. It was reported that during this somatic to embryogenic transition state, cells have to de-differentiate, activate their cell division cycle and reorganize their morphology, physiology, metabolism and gene expression patterns (Feher *et al*., 2003) and the search for such genes resulted in the discovery of *SERK* genes (Schmidt *et al*., 1997).

Correspondence: KumariJayasree P. (Email: kumarijaya@rubberboard.org.in)