Rubber Science, **30**(1): 25-41, 2017 *RESEARCH ARTICLE*

CLONING AND CHARACTERIZATION OF A FULL-LENGTH *CAB* GENE ENCODING THE LIGHT HARVESTING CHLOROPHYLL A/B BINDING PROTEIN IN *HEVEA BRASILIENSIS*

R.G. Kala, R. Supriya, Suni Annie Mathew, R. Jayashree and A. Thulaseedharan

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

Received: 15 March 2017 Accepted: 05 April 2017

Kala, R.G., Supriya, R. Mathew, S.A. Jayashree, R. and Thulaseedharan, A.(2017). Cloning and characterization of a full-length *CAB* gene encoding the light harvesting chlorophyll a/b binding protein in *Hevea brasiliensis*. *Rubber Science,* **30**(1): 25-41.

A full-length genomic DNA encoding the light harvesting chlorophyll a/b binding protein (*CAB*), expressed mainly in green leaves, for which the expression is reported to be directly related to the juvenility of the plant tissues, was cloned and sequenced. Initially *CAB* gene was amplified through PCR from the genomic as well as cDNA of *Hevea brasiliensis* using primers designed from the conserved regions of the *CAB* gene reported earlier from related plant species. The PCR amplified fragment (0.5 kb) was eluted, cloned and sequenced. The sequence revealed the presence of 525 bps that showed 91 per cent homology with *CAB* mRNA from *Ricinus communis*. Further, full length *CAB* gene (0.8 kb) was amplified from genomic DNA using *Ricinus communis* specific primers. The sequence revealed the presence of a fragment of 802 bp which showed 90 per cent sequence homology with the reported cDNA sequence of *CAB* gene from *Ricinus communis*. The region amplified in the present study contains the full protein coding sequence with no introns. The phylogenetic tree showed the close relationship of the *CAB* gene of *Hevea* with *Ricinus communis* and *Populus trichocarpa* apart from the other eukaryotic plants. The amino acid sequence deduced spans an open reading frame of 265 amino acids with predicted molecular weight of 28 kDa and iso-electric point (pI) as 5.45. A protein model was also predicted for the amino acid sequence. This is the first report on isolation and characterization of a full length *CAB* gene from *Hevea brasiliensis*.

Key words*: CAB* gene, Cloning, Characterization, Differential expression

INTRODUCTION

Hevea being a cross pollinated, the seedlings are highly heterozygous. Through conventional breeding elite clones have been developed and are propagated commercially by bud grafting. Plant regeneration systems in *Hevea* need to be developed from clonal materials which are physiologically mature for use in genetic transformation experiments. The explants collected from mature clonal materials are highly recalcitrant to *in vitro* culture when compared with seedling derived materials in *Hevea*. Despite these limitations, plant regeneration systems have been developed in *Hevea* from different explants and these are being utilized in transgenic plant development (Thulaseedharan *et al.*, 2014; 2017). Somatic embryogenesis and plant

Correspondence: Kala R.G. (Email: rgkala@rubberboard.org.in)