

Osmotic, oxidative and salinity stresses upregulate the expressions of Thiamine (vitamin B1) biosynthesis genes (THIC and THI1/THI4) in oil palm (*Elaeis guineensis*)

ABSTRACT

Thiamine or vitamin B1 comprises a pyrimidine moiety and a thiazole moiety. Thiamine pyrophosphate (TPP), the active form of thiamine, acts as a cofactor for various major enzymes for example transketolase (TK), α -ketoglutarate dehydrogenase (KGDH) and pyruvate dehydrogenase (PDH). In this study, the gene transcripts of first two enzymes in thiamine biosynthesis pathway, THIC and THI1/THI4 were identified and amplified from oil palm tissues. Primers were designed based on sequence comparison of the genes from *Arabidopsis thaliana*, *Zea mays*, *Oryza sativa* and *Alnus glutinosa*. The oil palm's response in terms of the expression profiles of these two thiamine biosynthesis genes to osmotic stress, salinity stress and oxidative stress were analysed in this project. This is due to the suggestion that TPP plays another important role, which is protecting plants against abiotic and biotic stresses. Both THIC and THI1/THI4 gene transcripts were successfully amplified and the expressions of the gene transcripts were detected using reverse transcriptase polymerase chain reaction (RT-PCR). The levels of expressions were measured and the results showed that the expression of THIC gene transcripts showed increase in gene expression in conjunction with increase concentration of stress inducer.

Keyword: Thiamine; Vitamin B1; Osmotic stress; Oxidative stress; Salinity stress; Gene expression