

The effect of oxidative stress towards the expression of thiamine biosynthesis genes (THIC and THI1/THI4) in oil palm (*Elaeis guineensis*)

ABSTRACT

Thiamine is known to be an important compound in human diet and it is a cofactor required for vital metabolic processes such as acetyl-CoA biosynthesis, amino acid biosynthesis, Krebs and Calvin cycle. Besides that, thiamine has been shown to be involved in plant protection against stress. In this study, the level of expression of THIC and THI1/THI4, the genes for the first two enzymes in the thiamine biosynthesis pathway were observed when oil palm (*Elaeis guineensis*) was subjected to oxidative stress. Primers were designed based on the consensus sequence of thiamine biosynthesis genes obtained from *Arabidopsis thaliana*, *Zea mays*, *Oryza sativa*, and *Alnus glutinosa*. Oxidative stress were induced with various concentrations of paraquat and samplings were done at various time points post-stress induction. The expression of THIC and THI1/THI4 genes were observed via RT-PCR and qPCR analysis. The expression of THIC was increased 2-fold, while THI1/ THI4 gene transcript was increased 4-fold upon induction of oxidative stress. These findings showed that oil palm responded to oxidative stress by over-expressing the genes involved in thiamine biosynthesis. These findings support the suggestion that thiamine may play an important role in plant protection against stress.

Keyword: Thiamine; Oxidative stress; Oil palm; Gene expression