Identification and functional characterization of MYB transcription factors involved in flavonoid biosynthesis in pulps of durian

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Abstract: Durian fruit possess high nutritional values due to its enriched bioactive compounds such as phenolics, carotenoids, and vitamins. Flavonoids are phenolic substances exhibiting powerful antioxidant activity. Although, flavonoid biosynthesis is modulated by various transcription factors (TFs), MYB TFs play a key role in controlling key genes in this pathway. Here, we identified candidate MYB TFs from our transcriptome database of Monthong cultivar. Upregulated MYBs at ripe stage were considered as a transcriptional activator because of the positive correlation between flavonoid biosynthetic genes and flavonoid accumulation level in ripe durian pulps. Two highly expressed-candidate MYB activators, DzMYB1 and DzMYB2, at the ripe stage were selected for functional characterization. Flavonoid contents detected by LC-MS/MS in transiently expressed either *DzMYB1*- or *DzMYB2*-*Solanum lycopersicum* cv. Micro-Tom fruit were increased when compared with those expressing GFP controls. Furthermore, we showed that *DzMYB1* controls flavonoid biosynthesis via regulating the promoter of various biosynthetic genes; phenylalanine ammonia-lyase (PAL), chalcone synthase (CHS), chalcone isomerase (CHI) and dihydroflavonol reductase (DFR) while DzMYB2 regulates the promoters of CHS, CHI, and flavanone 3-hydroxylase (F3H) leading to activate their expression. We further found that *DzMYB2* probably functions as a homodimer in the regulation of flavonoid biosynthesis. These findings provide more insight into the functional roles of MYB proteins in the regulation of flavonoid pathway in durian pulps.

Keywords: MYB transcription factor; flavonoid biosynthesis; durian

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