

Chanattika Kamdee 2014: Regulation of Lignin Biosynthesis in Fruit Pericarp Hardening of Mangosteen (*Garcinia mangostana* L.) after Impact. Doctor of Philosophy (Horticulture), Major Field: Horticulture, Department of Horticulture. Thesis Advisor: Professor Saichol Ketsa, Ph.D. 179 pages.

Pericarp hardening in fresh mangosteen (*Garcinia mangostana* L.) fruit is a rapid in response to mishandling during and after harvest. Firmness, lignin content and lignin composition (G and S lignin) increased rapidly, while total free phenolic contents decreased in damaged mangosteen pericarp following impact. Application of nitrogen atmosphere to the fruit after impact reduced these effects, compared with the fruit kept in ambient air. A full length mangosteen MYB transcription factor (R2R3 MYB) and all the lignin biosynthetic pathway genes were isolated, including phenylalanine ammonia lyase (*GmPAL*), cinnamate 4-hydroxylase (*GmC4H*), *p*-coumaroyl shikimate 3-hydroxylase (*GmC3H*), ferulate (coniferaldehyde) 5-hydroxylase (*GmF5H*), 4-coumarate: coenzyme A ligase (*Gm4CL*), hydroxycinnamoyl coenzyme A shikimate hydroxycinnamoyl transferase (*GmHCT*), cinnamoyl CoA reductase (*GmCCR*), caffeoyl CoA O-methyltransferase (*GmCCoAMT*), caffeic acid (5-hydroxyconiferaldehyde) O-methyltransferase (*GmCOMT*), cinnamyl alcohol dehydrogenase (*GmCAD*) and peroxidase (*GmPOD*). Expression analysis using qPCR showed that of the genes encoding enzymes in lignin biosynthesis, only *GmF5H* increased after impact and correlated highly with increases in firmness and lignin content. The transcript level of a stress-related R2R3 MYB transcription factor was significantly increased by impact. These results suggest that pericarp hardening of mangosteen after impact is due to rapid transcriptional activation of late steps of the lignin biosynthetic pathway, potentially via up-regulation of transcription factors such as R2R3 *GmMYB30*.

---

Student's signature

---

Thesis Advisor's signature