

Sutin Kunyamee 2009: Gene Expression of Expansins and Cell Wall Degrading Enzymes during Fruit Growth and Ripening of Sapodilla (*Manilkara zapota* van Royen). Doctor of Philosophy (Tropical Agriculture), Major Field: Tropical Agriculture, Interdisciplinary Graduate Program. Thesis Advisor: Professor Saichol Ketsa, Ph.D. 156 pages.

Flesh firmness of sapodilla (*Manilkara zapota*) fruit cvv. Makok-Yai and Kra-Suay sharply decreased after harvest. The decrease in fruit firmness was hastened by ethylene treatment, and prevented by 1-methylcyclopropene (1-MCP) treatment. Two genes encoding expansins (called *MzEXP1* and *MzEXP2*) and three genes encoding cell wall-degrading enzymes [called *MzEG* (endo- β -1,4-glucanase), *MzPL* (pectate lyase) and *MzPG* (polygalacturonase)] were isolated. In both cultivars studied (Makok-Yai and Kra-Suay), *MzEXP1* and *MzEG* were transiently expressed early during fruit development on the plant. The transcript was not detectable after harvest and during fruit ripening. In contrast, *MzEXP2* was expressed between 1 day before harvest and day 4 after harvest in cv. Makok-Yai. In cv. Kra-Suay the expression of *MzEXP2* started 8 weeks before the harvesting stage, and ended on day 3 after harvest. When fruits of both cultivars were treated with ethylene just after harvest, the expression of *MzEXP2* became undetectable. After 1-MCP treatment, *MzEXP2* mRNA was highly abundant until day 5 after harvest, while the transcript abundance of the control was undetectable. The expression of *MzEXP2* ceased, both in controls and ethylene-treated fruits, when the fruit reached a rather low threshold firmness. The mRNA of the isolated *MzPL* and *MzPG* accumulated during fruit ripening. Ethylene treatment advanced the high transcript abundance in both genes. The expression of *MzPG* was well correlated with the decrease of fruit firmness throughout the treatments, whereas the expression of *MzPL* was not. The expression of the isolated *MzPG*, was correlated with the increase of PG activity, the loss of firmness and the increase of water-soluble pectin content.

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Thesis Advisor's signature

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