

Development of Specific-Molecular Marker for Sex Determination among Papaya Cultivars Grown in Phitsanulok Province, Thailand

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ABSTRACT

Papaya (*Carica papaya* L.) is the one of important economical fruit plants in Thailand. Its sex-type determination in an early seedling stage is extremely significant for commercial production because it sufficiently accelerates the productive hermaphrodite plants in orchard. The aim of this research was to develop specific-molecular marker for sex determination among five different papaya cultivars (Holland, Khaek-Dam, Koko, Khak-Nuan, and Si-Sa-Ket), grown in Thailand. The result revealed that the SCAR-W11-F and SCAR-W11-R markers were very useful for detecting male and hermaphrodite of five studied papaya cultivars, by giving the accurate PCR product approximately 830bp length in male and hermaphrodite but not in female. Furthermore, the new designed marker (PH2-F and PH1-R), were successfully useful to determine only in hermaphrodite of all validated papaya cultivars, by generating the PCR product (approximately 101bp length). These indicated that both molecular markers were greatly beneficial and valuable to identify the sex types of papaya plants at an early seedling stage.

Key words: papaya, sex determination, PCR, molecular marker

INTRODUCTION

Papaya (*Carica papaya* L.) is the one of important economical fruit plants in Thailand, of which widely grown in all regions. Its unripe fruit is an important ingredient of a very popular Thai-salad (called Som Tam), and milky latex in green fruit contains the proteolytic-enzyme papain used in many manufacturing industries such as hydrolyzing beer peptides (chillproofing), tenderizing meats, and medicinal applications (Ming *et al.*, 2007). The ripe papaya fruit is mostly popular to consume as a fresh-cut fruit, containing the essential nutrients such as vitamin E, vitamin B, carotenoid, lycopene, calcium, potassium and fiber (Chandrika *et al.*, 2003).

In papaya plants, the sex is one of mainly essential traits for papaya breeding program and fruit production, in that is trioecious with three basic sex forms: female, male and hermaphrodite on separate plants. Both female and hermaphrodite flowers can produce fruits, but not in male flower. However, the fruit