

Effects of Environment and Cultivars on Anthocyanin Content in Wax Apple Fruit Skin

Szu-Ju Chen¹, Kuo-Tan Li^{2,4}, Der-Ming Yeh², Zen-Hong Shu³

Abstract

Fruit size, shape, maturity, color, texture, flavor, sugar and acid content are important factors on fruit quality. Consumers prefer to choose fruits those with deep red color, though the depth of red color could not represent the maturity or sweetness of fruits. There are white, green and red color in fruit skin among different wax apple varieties, and most of the main varieties in Taiwan are red-skin lines. Because anthocyanin has effects of anti-oxidation, anti-inflammatory and anticancer, enhancing fruit coloration not only increases the value of fruit appearance, but also was meant for human health. We reviewed the effects of environment factors and cultivars on anthocyanin content in wax apple fruit in this article. The anthocyanin in 'Pink' wax apple was composed of cyanidin and peonidin. Its biosynthesis went through a light-induced pathway, and was correlated with phenylalanine ammonia-lyase (PAL) activity. Researchers tested factors which may affect anthocyanin accumulation in a young fruit skin *in vitro* cultivation system. Addition of sugar in the *in vitro* cultivation mediums increased anthocyanin accumulation of fruit skin, especially in the treatment of sucrose. In the field, hydrogen peroxide spray and shoot girdling treatments increased anthocyanin concentration in Malaysia wax apple fruit skin. Temperature of higher than 30°C was unfavorable to fruit coloration in 'Pink' wax apple fruit. Even though, different cultivars of wax apple may have different composition of anthocyanins, PAL activity and heat tolerance. Therefore, selection of heat insensitive cultivars could be an ultimate solution to ease fruit coloration problem for summer production.

Key words: cyanidin, girdling, peonidin, phenylalanine ammonia-lyase

¹ Assistant Researcher, Kaohsiung District Agricultural Research and Extension Station, COA, EY. and Ph. D. student, Department of Horticulture and Landscape Architecture, National Taiwan University, Taipei, Taiwan, R.O.C.

² Assistant Professor and professor, respectively, Department of Horticulture and Landscape Architecture, National Taiwan University, Taipei, Taiwan, R.O.C.

³ Professor, Department of Biological Science and Technology, Meiho University, Pingtung, Taiwan, R.O.C.

⁴ Corresponding author: kuotanli@ntu.edu.tw