

Title Influence of harvest maturity on fruit quality, color development and phenylalanine ammonia-lyase (PAL) activities in Chinese bayberry during storage

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Abstract

Chinese bayberry (*Myrica rubra* Sieb. and Zucc.) fruit is a commercially important fresh fruit in southeast China. It is one of the most perishable fruit with appealing red to purple color and rich taste. To date, very little information is available on the effect of pre-harvest factor such as harvest maturity on fruit quality and physiology changes during postharvest storage. The aim of this study was to investigate the effect of harvest maturity on fruit color, quality change of Chinese bayberry during postharvest storage, and to examine the relationship between anthocyanin content and PAL activity. On the basis of visible fruit color, harvested Chinese bayberry fruit (cv. Wumei) were categorized in four stages of ripeness: unripe (green); color turning (pink); mature (red); ripe (dark violet). A total of 5 kg fruit of each maturity category was selected. The fruit were stored at 20°C, RH 85%-90%, and the storage time was ended if any berries with visible mold growth. During storage, 3 replicated random samples of the fruit from each maturity category were selected every 6 hours to measure the quality parameters except for fruit ethylene production and respiratory determination. Respiratory rate and ethylene production were measured every 3 hours during storage. Results showed that, ethylene production and respiration in all bayberry fruits decreased with storage time, and fruit harvested at color turning stage had the highest respiratory rate and second higher ethylene production. Unripe, and color turning bayberry fruit reddened with the increase of total anthocyanin content and phenylalanine ammonia-lyase activity. A positive linear relationship between the maximum PAL activity and the amount of anthocyanin accumulated suggest that the change in PAL activity is involved in the biosynthesis of anthocyanin in fruit after harvest. Decrease of fruit firmness, vitamin C content, total titratable acidity content, and total sugar content with storage period in each category indicates the quality deterioration of Chinese bayberry fruit after harvest. These results suggest that, although unripe bayberries became red during storage, they do not undergo sufficient changes in color and quality to be suitable for freshly consumption, and the optimum harvest stage of Chinese bayberry is full ripeness.