Effects of salicylic acid and putrescine on storability, quality attributes and antioxidant activity of plum cv. ‘Santa Rosa’

Gholam Hossein Davarynejad · Mehdi Zarei · Mohamad Ebrahim Nasrabadi · Elham Ardakani

Abstract Plum fruit has a short shelf life with a rapid deterioration in quality after harvest. The primary goal of this study is to investigate and compare the effect of putrescine and salicylic acid on quality properties and antioxidant activity of plum during storage. The plum fruits (cv. ‘Santa Rosa’) were harvested at the mature ripe stage, and dipped in different concentrations of putrescine (1, 2, 3 and 4 mmol/L) and salicylic acid (1, 2, 3 and 4 mmol/L), as well as distilled water (control) for 5 min. The fruits were then packed in boxes with polyethylene covers and stored at 4 °C with 95 % relative humidity for 25 days. A factorial trial based on completely randomized block design with 4 replications was carried out. The weight loss, fruit firmness, total soluble solids, titratable acidity, pH, maturity index, ascorbic acid, total phenolics and antioxidant activity at 0, 5, 10, 15, 20 and 25 days after harvest were recorded. During the storage period, the weight loss, total soluble solids, pH and maturity index increased significantly while the fruit firmness, titratable acidity, ascorbic acid, total phenolics and antioxidant activity decreased significantly \((P < 0.05)\) for all treatments. Statistically significant differences were observed between different treatments (putrescine, salicylic acid and control) in all measured parameters. The data showed that the weight loss and softening of the plum fruits were decreased significantly by the use of putrescine and salicylic acid. Also, exogenous treatments of putrescine and salicylic acid are found to be effective in maintaining titratable acidity, ascorbic acid, total phenolics and antioxidant activity in plum fruits during storage at 4 °C.

Keywords Prunus salicina · Postharvest · Properties · Shelf life · Ascorbic acid · Total phenolics

Introduction

Plums belong to the Rosaceae family and are one of the most important stone fruits (Manganaris et al. 2007). The two distinct types of ripening behaviour have been observed for plums; ‘Beauty’, ‘Gulfruby’, ‘Santa Rosa’ and ‘Black Star’ cultivars have typical climacteric fruits ripening patterns, in contrast to ‘Shiro’, ‘Rubyred’ and ‘Golden Japan’ which exhibit a suppressed-climacteric phenotype (Serrano et al. 2003; Díaz-Mula et al. 2009). The plum has been of recent interest for its nutritional, antioxidant activity and its consumers increased considerably. In this sense, plum is known to contain considerable vitamins (A, C and E), anthocyanins and other phenolic compounds and carotenoids (Stacewicz-Sapuntzakis et al. 2001). These parameters may supply important information to the consumer in terms of recognizing a more nutritional fruit.

Postharvest decay is the major factor limiting the extension of storage life of many fresh fruits. Plum has a short shelf life and its quality deteriorates rapidly after harvest (Perez-Vicente et al. 2002). Little research has been done on improving the quality properties and shelf life of plum fruit. Recent works studied low temperature storage and application of putrescine (Khan et al. 2008), postharvest treatments whit polyamines (Perez-Vicente et al. 2002), calcium and heat (Serrano et al. 2004), 1-methylcyclopropene (1-MCP) (Menniti et al. 2006) and salicylic acid (Luo et al. 2011).

Recently, there is an increasing interest in the use of natural compounds for maintenance of fruit quality and extension of...