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To cite this article: Yunzhenzi He *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **237** 052066

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The fruit quality change of less mature blueberry in different postharvest storing temperatures

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Abstract. In this experiment, we investigated the effects of different postharvest temperature treatments on the quality of blueberry purple fruit. We compared the changes in weight, firmness, water content and soluble solids content of purple fruit at 4°C and 25°C respectively. The results showed that different treatments have different effects on preservation of blueberry ‘Brigitta’.

1. Introduction

Blueberry (*Vaccinium* spp.) is rich in anthocyanins, low in sugar and fat, and has antioxidant capacity. It is called as “the king of berries” and is a world-class high economic value fruit [1-4]. Low temperature is a commonly used preservation method in fruit and vegetable storage. Low temperature storage is conducive to reducing the loss of fruit quality, prolonging the storage period and sales cycle [5-10]. To keep the shelf life longer, blueberry fruits are harvested generally in less mature condition. The less mature fruits are usually in purple skin. This study aimed at the fruit quality of harvested blueberry purple fruit stored at 4°C and 25°C. We used the variety ‘Brigitta’. The two storage temperatures were compared by analyzing the physiological indexes of fruits at different maturity levels. The results of the experiment are expected to provide practical guidance for the development of blueberry preservation technology.

2. Material and methods

2.1. Material

The blueberry variety ‘Brigitta’ fruits were used. Fruits were harvested in blueberry orchard in Qionglai, Sichuan, China. The less mature fruits, purple in skin, were tested in this research.

2.2. Methods

The fruits (125g) were put in one PU box. Eight PU boxes of fruits were prepared, of which 4 boxes were stored in 4°C (low temperature treatment) and another 4 boxes were stored 25°C (controlled experiment). In the experimental treatment and the controlled experiment, each PU box was one biological replication, and there were totally four replications. Weight, firmness, water content and soluble solid content were investigated once every 2 days during the post-harvest storage.



Ten fruit samples were randomly selected at each measurement. We used the fruit firmness tester to measure the firmness, used the vacuum drying method to determine the water content, and used a portable refractometer to determine the soluble solids content.

3. Results

3.1. Effect of different temperature on blueberry weight

The weight of purple fruit was significantly reduced after seven days of storage, both at 4°C and 25°C (Fig. 1). The weight was reduced less at 4°C than at 25°C. Before the third day, weight reduced faster at 4 degrees, and after the third day weight reduced faster at 25 degrees.

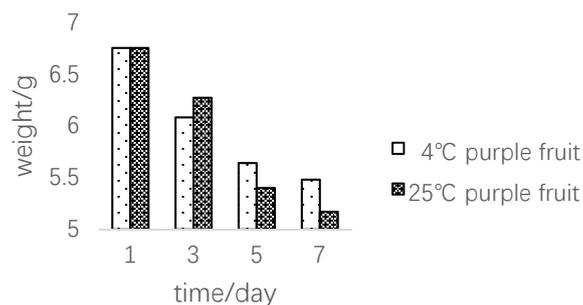


Fig. 1 Effect of different temperature on 'Brigitta' weight

3.2. Effect of different temperature on blueberry firmness

In seven days of storage, the firmness of purple fruit first dropt and then rose and then declined (Fig. 2). The fruit firmness at the seventh and first day of purple fruit was about the same at 4°C and decreased at 25°C, which explain that low temperature helps prevent blueberry pulp softening.

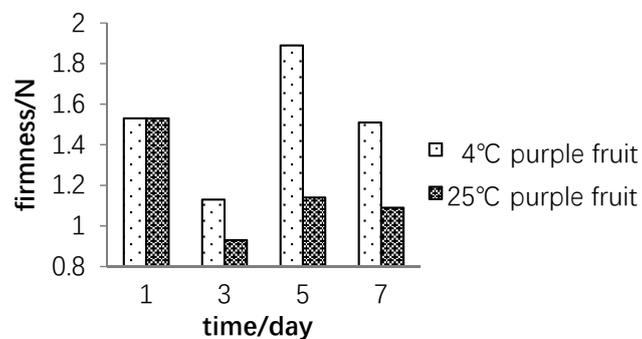


Fig. 2 Effect of different temperature on 'Brigitta' firmness

3.3. Effect of different temperature on blueberry water content

The water content of purple fruit fluctuated and declined within seven days of storage, both at 4°C and 25°C (Fig. 3). The fruit dehydrate more at 4°C than at 25°C. However, there is little difference in water loss between at 4°C than at 25°C, and the low temperature also preserves the moisture of blueberry.

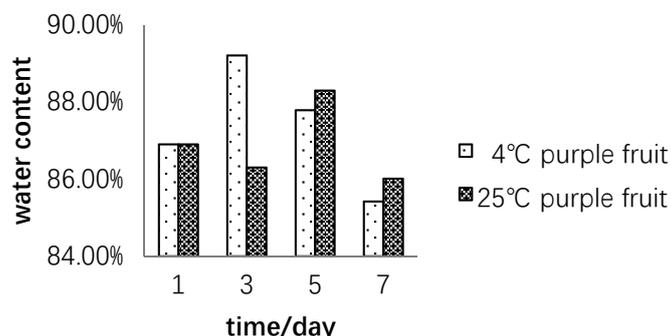


Fig. 3 Effect of different temperature on 'Brigitta' water content

3.4. Effect of different temperature on blueberry soluble solids content

The purple fruit gradually accumulated soluble solids during storage (Fig. 4). The soluble solid content of purple fruit on the seventh day was slightly higher than that on the first day. Although it fluctuates less and grew more at 25°C than at 4°C, there is little difference in the accumulation of soluble solids at 25°C than at 4°C, indicating that soluble solids can be effectively accumulated at low temperatures.

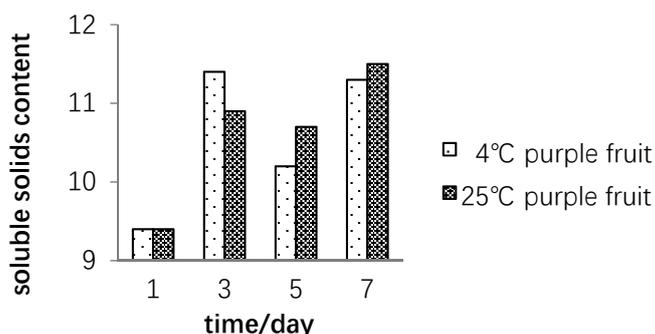


Fig. 4 Effect of different temperature on 'Brigitta' soluble solids content

4. Discussions

The results showed that at 4°C the fruit weight and firmness of purple fruits were both higher than the fruits stored at 25°C, except for the content of soluble solids and water content. Under low temperature storage conditions, the physiological metabolic activities and microbial growth of blueberries are inhibited^[11-12], and also has a negative impact on the accumulation of fruit flavor substances. Our experiment could provide reference for future blueberry storage. It is possible to obtain good economic benefits if applying the results of this experiment to production practice.

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