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Preservation of Snake Fruit Cultivar Pondoh (*Salacca edulis* Reinw.) at Cold Temperature Storage

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Abstract

This study was done to preserve snake fruit cultivar Pondoh cold temperature storage. Snake fruits was obtained from Turi, Sleman, Yogyakarta and transferred to the laboratory with the aseptic condition. The sortation based on the visual method was used to collect the proper snake fruit. The cleaning using aseptic cloth was done prior to storage. The snake fruit was collected individually in refrigeration containers at temperatures of 10±5°C. The storage was done for 30 days and it was stopped until appearance of physical damage in snake fruit. The result indicates that the storage using this method might extend the shelf-life of snake fruit until 28 days. However, snake fruit was hardly to peeled and dry. It can be concluded that cold temperature might extend the shelf-life of snake fruit.

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Introduction

Snake fruit is one of the tropical commodities export in Indonesia to various countries in the form of stem and non-stemmed condition which is popular because it has a sweet, crisp and rich in nutrients (Wijanarti *et al*., 2016; Zubaidah *et al*., 2017). However, the problem is that fruit are easily infected with fungus *Aspergillus* spp., *Ceratocystis* spp. and *Fusarium* spp. also easily to get enzymatic browning reaction (Tian *et al*., 2005; Wulandari and Ahmad, 2018) which can cause damage to nutritional quality, taste and aroma (Pan *et al*., 2012; Dharmaputra *et al*., 2013) also visual quality that can reduce consumer acceptance (Sagar and Kumar, 2010) which can occur during storage both at room and cold temperature (Chidtragool *et al*., 2011). The enzymatic browning reactions is caused by the activity of the polyphenol oxidase enzyme (PPO) which converts phenol compounds to o-quinone which causes a brownish color (Rasouli and Saba, 2018).

However, fungal infections and PPO enzyme activity could be inhibited by various methods (Oms-Oliu *et al*., 2010; Al-Baarri *et al*., 2018; Bafort *et al*., 2014) for example atmosphere packaging and spraying antimicrobial and antibrowning compound as well (Rojas-Grau and Martin-Belloso, 2008; Ghidelli *et al*., 2015). Antimicrobial compounds which came from essential oil such as kiwi fruit and citrus might inhibit microbial growth (Lancioti *et al*., 2004) because it caused degradation of cytoplasm and protein membrane of microorganism (Burt, 2004). However, essential oil had a low solubility and leave negative impact to taste (Gutierrez *et al*., 2008). In order to inhibit the activity of PPO enzyme it also has been known using chemical compound based on ascorbate, calcium and thiol (Ioannou and Ghoul, 2013). However, chemical compound such as calcium chloride could leave negative impact to taste (Abd-Alhady, 2014). Thus, it requires a method that easy to applied without negative impact to taste. This study was done using cold storage condition as it could be applied to most food variants (Al-Baarri, 2016). Based on the knowledge, there was no documentation yet about refrigeration on snake fruits, that why this study aim to know refrigeration to snake fruit. This study may provide information of snake fruit preservation using cold storage.

Materials and Methods

This research used 5 months harvest time, that was obtained from Turi Village, Sleman Regency, Yogyakarta, the aseptic refrigerator was provided by Central Laboratory for Research and Services Diponegoro University (CORES DU). Plastic knife and latex gloves was used to determine the physical condition of snake fruits.

Snake fruit was transferred to laboratory without any preservation. The location of cultivation and laboratory was 3 hour in a distance by car. The aseptic container was provided to keep the quality of snake fruits. Container was also equipped using the soft materials to avoid the physical movement that may affected to the quality. The sortation was done based on visual method and only the non-physically damaged and non-moldy of snake fruits was collected. The cleaning using aseptic cloth was also done individually. Then, snake fruit was individually in aseptic refrigerator at temperature of 10±5˚C. The preservation was done for 30 days.

Results and Discussion

This research used 5 months harvest time of snake fruit as the common duration for harvesting the snake fruits. During harvesting, snake fruits was treated in aseptic plastic bag to avoid microorganism contamination that may affect to the quality of snake fruit. Turi, Sleman, Yogyakarta was chosen as snake fruit cultivation since this area was the biggest snake fruits production in Yogyakarta.

The results indicate that storage in cold temperature might keep shelf-life of snake fruit life until 28 days without any damage on physical and no mold was found based on visual appearance. However, the skin of snake fruit was dry. This may be explained that snake fruit had a higher respiration rate in refrigerator. The greater rate of respiration causes the fruit more quickly damage that shorten the shelf-life (Adirahmanto *et al*., 2013). Physical injury might contribute to the easily infection by microbe and enzymatic browning (Rawat, 2015; Wardhani *et al*., 2016).

Snake fruit that stored in cold temperature generally had a shelf-life up to 1 month (Gunadnya, 2009). Thus to extend the shelf-life of snake fruits, may be achieved by avoiding the respiration rate in snake fruits through the modification on refrigerator or using the individual snake fruits container. Since the oxidase may contribute to the enzymatic browning on snake fruits, thus the preservation to inhibit this enzyme may also be required.

Conclusion

Based on this study, it can be concluded that preservation in cold temperature might extend the quality of snake fruit up to 28 days but it provide the dry skin of the fruits.

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