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Selecting Postharvest Technology Method for Citrus Fruit using Analytic Hierarchy Process (AHP)

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Abstract

Ehime Prefecture is one of the main citrus fruit producing regions in Japan. As many as 20 major citrus varieties are cultivated in Ehime annually. The harvest of citrus fruit in a large scale has brought the consequences in the postharvest deterioration. It could be caused by many factors, including metabolic changes, (biochemical changes associated with respiratory metabolism, ethylene biosynthesis and action, and compositional changes), growth and development (anatomical and morphological changes), physical injuries, water loss, physiological disorders, and pathological To reduce these losses, it is suggested to apply proper handling methods or postharvest technologies that delay senescence and maintain the best possible quality. There are some handling methods or postharvest technologies that can be used to maintain the quality of citrus fruit, such as: modified atmosphere packaging (MAP), controlled atmosphere storage (CAS), coatings, hot water treatment, and etc. In this paper, analytic hierarchy process (AHP) is used to select the best postharvest method for preserving citrus fruit in Ehime. The ability of the AHP to provide selection of the postharvest technology with process flexibility like criteria selection, technology selection and criteria weightages allows its use by students, researchers, entrepreneurs, technology facilitators, policy makers, etc.

Keywords: *Analytic hierarchy process, postharvest, citrus.*

1. INTRODUCTION

Postharvest deterioration of citrus fruit could be caused by many factors, including metabolic changes, (biochemical changes associated with respiratory metabolism, ethylene biosynthesis and action, and compositional changes), growth and development (anatomical and morphological changes), physical injuries, water loss, physiological disorders, and pathological breakdown. On the other hand, citrus postharvest quality and shelf life are becoming increasingly aspects, as consumers expect the quality fruit to be available throughout the year (Ladaniya 2008). Therefore, harvesting and handling hold the key to getting desired results from postharvest treatments.

There are some handling methods or postharvest technologies can be used to maintain the quality of citrus fruit, such as: modified atmosphere packaging (MAP)(Kader and Zagory 1989; Porat et al. 2004; Techavises and Hikida 2008; Zagory and Kader 1988) and controlled atmosphere storage (CAS) (Dirpan and Hikida 2015), coating or waxing(Ben-Yehoshua, Burg, and Young 1985; Chien, Sheu, and Lin 2007; Hagenmaier and Baker 1993; Park 1999), hot water treatment(Hong, Lee, and Kim 2007; Porat et al. 2000) and hot calcium dip (Nutakorn, Yoshio, and Toshio 2011). However, every method has drawbacks and advantages in preserving citrus fruit. Therefore, the first objective of this research is to select the best postharvest technology using analytic hierarchy process (AHP).

Analytic hierarchy process (AHP) has been applied to a variety of agriculture (Alphonce 1997; Chavez, Berentsen, and Oude Lansink 2012; Xu, Da, and Chen 2003). However, little attention has been given so far to the application of the AHP to the postharvest technology, although the AHP

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