CHAPTER 1

INTRODUCTION

1.1 Principles, rationale and hypothesis

Longan fruit (*Dimocarpus longan* Lour.) is a non-climacteric subtropical fruit, and one of the most valuable fruits in Thailand for export (Tongdee, 1997). Thailand is currently the largest exporter of longan fruit in the world (Chomchalow and MacBaine, 2003). The fruits are harvested when eating quality and visual appearance are optimal (Paull and Chen, 1987). However, longan fruits have a very short postharvest life of 3-4 days under ambient temperatures (Tongdee, 1997; Siripanich *et al*., 1999). The major factors reducing the storage life and marketability of longan fruit are pericarp browning and microbial decay. The pericarp browning resulted from desiccation and/or heat stress, senescence, and chilling injury. Susceptibility of longan fruit to chilling injury has been questioned since it is difficult to separate effects of chilling from those of either desiccation or fruit senescence (Jiang *et al*., 2002). Zhou *et al*. (1997) reported chilling injury as irregular patches of browning on the longan pericarp cv. "Shixia" after exposure to less than 4°C. However, these symptoms have no effect on flavor or aril quality. Discoloration causes the longan fruit to bring a lower price and even become unmarketable because of consumer preference for fruit with better visual appearance (Jiang *et al*., 2002). There is limited information on ultrastructure, including biochemical and chemical components of longan fruit pericarp changes during low temperature storage that induce chilling injury.

1.2 Research objectives

- To compare the anatomical and biochemical changes between normal and chilling injured longan fruit pericarps.
- To identify the main classes of phenolic compounds and other components of normal and chilling injured longan fruit pericarps.

1.3 Research scope

- Uses of stereomicroscope, light microscope (LM), scanning electron microscope (SEM) and transmission electron microscope (TEM) to study the anatomical characteristics of normal and chilling injured longan pericarps.
- Analysis of biochemical and chemical components of normal and chilling injured longan pericarps.

1.4 Usefulness of the research

Results from this research will help to understand the browning process of longan fruit, the anatomical changes and the biochemical transformations in the pericarp resulting from chilling injury during postharvest storage. Furthermore, results from this research should be beneficial in developing storage procedure to extend storage life and preserve the quality of the longan fruit without inducing chilling injury.

1.5 Research locations

- Postharvest Technology Institute, Chiang Mai University, Chiang Mai 50200, Thailand.
- Horticultural Postharvest Laboratory, Department of Horticulture, Faculty of Agriculture, Chiang Mai University, Chiang Mai 50200, Thailand.
- USDA/ARS, Citrus and Subtropical Products Laboratory, 600 Avenue S, Northwest, Winter Haven, Florida 33881, USA.