

## Chapter 1

### Introduction

#### 1.1 Principle, theory, rationale and hypotheses

Orange juice is a favorite drink for breakfast and for many other times during the day as a refreshing drink. It is known for its good flavor as well as its nutritional value because the juice is an excellent source of vitamin C. Vitamin C may prevent oxidative damage that can cause cells to become cancerous, and it improves immune-cell functioning, enabling human body to fight off infections more efficiently. Orange juice has a potential as an antioxidant source that may protect against a variety of diseases including cataracts (a clouding of the eye's lens that can lead to blindness) and lung cancer. The juice is a good source of folate, which protects against neural-tube defects in fetuses (Schreibman, 2005). In addition, scientists have discovered an array of interesting and potent phytochemicals (plant chemicals) in citrus fruit. Up to now, they had identified at least 170 phytochemicals in orange juice. Citrus fruits also contain carotenoids and fiber - notably pectin, which helps lower cholesterol. They are also rich in polyphenols, which include a wide range of flavonoids and related compounds, many with beneficial effects (Anonymous, 2000).

In general, Thai people consume approximately 3 l/head/year of fruit juices, which is not a large quantity. The reason behind the relatively low consumption of fruit juice is that there are a variety of fresh fruit available all year round in Thailand and these fruits are easy to find. As a result, Thai consumers prefer to consume fresh fruits than fruit juice. In comparison, the European countries consume fruit juice with a preference of sour taste for 22.1 l/head/year. In Germany, apple juice is consumed as the most, followed by orange juices and mixed fruit juices. Grape juice is an unpopular juice (Tressler and Joslyn, 1971).

The problem of fresh orange juices is the juice has a shorter shelf life than pasteurized orange juices because of spoilage from lactic acid bacteria such as *Lactobacillus plantarum*, *Lactobacillus brevis*, *Lactobacillus thermophilus*, *Leuconostoc mesenteroides* and *Leuconostoc dextranicum* (Suklampoo, 2003). However, the fresh juice has a lot of nutrition and tastes better than pasteurized orange juices. Therefore, this study was designed to have a better understanding about factors that affect the shelf life and nutrition changing in fresh orange juices during storage at 4°C. The study was mainly focused on fresh orange juices that were extracted from orange fruit grown locally in the northern part of Thailand. Results of this study could be used not only to improve the quality of fresh orange juices, but it would also support the local orange farmers.

### 1.2 Objectives of the study

- Study the qualities of different varieties of fresh orange juices that were extracted from orange fruit grown locally in the North of Thailand.
- Investigate the effects of sugar and salt additions on the quality of fresh orange juices during chilled storage.
- Understanding the effects of orange sac addition and pH values on the quality of fresh orange juice during chilled storage.

### 1.3 Education/application advantages

- Increase the economical value of fresh orange juices in Chiang Mai by increasing its shelf-life.
- Improve the commercial value of low grade orange fruit that would give a benefit for orange farmers.