

CHAPTER 1

INTRODUCTION

1.1 Statement and significance of problem

One of the primary challenges in the field of botanical medicine is to effectively translate a beneficial traditional folk remedy into a beneficial product. One of these traditional products is noni (*Morinda citrifolia* Linn.) juice. Noni is a small tree that grows up to ten meters with irregular, open crown and shiny, dark green leaves. The tree possesses a light brown to light grey bark and light-colored wood. The noni tree flowers several times annually, producing clusters of small, five-petal blossoms with fine hair centers. It also provides oblong fruits with circular scars, which are green when unripe and yellowish-white when fully ripened. The fruits have a soft, watery flesh and a cheesy aroma that become increasingly pronounced and pungent during the ripening process. In traditional plant-based medicine, the fruit, flower, leaves, bark and root of noni have been used for diverse medicinal purposes (Dixon *et al.*, 1999).

Most people cannot obtain fresh fermented ripened noni juices. Therefore, people try to find methods for noni to be effectively translated into shelf-stable dietary supplements that can be consumed far away from the Hawaiian and Polynesian's island. The 5 enemies of all natural products are heat, light, air, moisture and time. Any noni preparation process should consider these factors, because some substances and the volatile constituents are unstable and can be easily destroyed (Sarinoni, 2002).

Some countries such as Costa Rica and Cambodia have increased the fields being cultivated in noni. In these countries, the fruit is often commercialized fresh or as juice in both formal and informal markets, but it is also found as pasteurized juice, either pure or mixed with other juices (usually grape or blackberry). Commercial

interest in noni has tremendously increased in recent years, as provided by the number of patents registered. In the United States alone, 19 patents have been registered by the US Patent and Trademark Office since 1976 (US Patent and Trademark Office, 2005). Noni juice has recently been accepted in the European Union as a novel food (European Commission, Scientific Committee for Food, 2002b). Nevertheless, despite the real market opportunities, there has been little scientific research to review the actual nutritional and functional properties of noni products. Furthermore, the phytochemical compounds responsible for their alleged properties have not yet been reviewed. As a result, optimization of agricultural/post-harvest practices or processing technologies has been neglected. In 1943, the U.S. government recognized the fruit as edible (Merrill, 1943). Thus there has been ample human experience with eating noni fruit to validate its safety for human consumption.

The consumer should only choose natural preservation, which is pasteurization, fermentation or fresh noni juices. Pasteurization uses a mild heat treatment and destroys some of the sensitive enzymes, alkaloids, vitamins and other phytochemicals. Proxeronine is especially sensitive to heat and it is one of the most critical components of the noni juices, but pasteurization is a necessary process to reduce microbial contents in the product. Fermentation is by far is the best way to preserve fragile noni juices. Beside that, fermented noni juices have a longer shelf life. A prolong fermented noni juices will be a special high premium product because the active ingredients such as xeronine etc. will not be destroyed (Sarinoni, 2002).

Nowadays, noni fruits are increasingly more popular because of its medicinal benefits. Noni fruits are produced for daily consumption in the form of juices and fermented juices. Although there are plenty of information regarding the benefits of noni fruits and different parts of noni trees from the medical point of view, there is a little information about microorganisms in these products. Therefore this project was aimed to provide this unavailable information. Microorganisms in noni juices and fermented noni juices produced from laboratory and commercial production would be found out.

1.2 The Objective of the study

The project was study about

1. The type and number of microorganisms in fresh noni fruit and noni products, particularly noni juices and fermented noni juices.
2. The changes in the microbiological composition during storage of pasteurized noni juices and during fermentation of fermented noni juices.

1.3 Education/application advantage

1. The microbiological information could be used to improve the quality of noni products, especially noni juices and fermented noni juices.
2. The study would provide a valuable microbiological information for the microbial safety of noni products for Thai consumers and beyond.
3. The study would support the Thai farmers and enterprenours that produced noni fruit and noni products as healthy food products.

1.4 Scope of study

In this project, fermented noni juices were incubated for 9 months. During the fermentation period, microorganisms in the fermented juices were analyzed on 0, 2, 4, 6, 8, 10, 12, 24 and 36 weeks for Total Plate Count (TPC), yeast and mould, lactic acid bacteria, Gram negative bacteria, spore forming bacteria, proteolytic bacteria, coliforms, pH value and total titratable acidity. The result of labororium fermented noni juices was compared with a commercial fermented noni juice. For noni juices, a commercial brand of noni juice was evaluated together with 4 different heat treated noni juices produced in a laboratory scale. Changes in the microbial quality of labororium noni juices were also monitored during 21 days storage at chilled and room temperatures.

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