Chapter 1
Introduction

1.1 Principles, theory, and rational

Sweet corn is not a race of maize or separate subspecies within the species of Zea mays (L.). Sweet corn, *Zea mays Saccharata*, is one of the most popular variety of corns in the U.S. and Canada. Comsumption of the corn is increased in Eastern Asia, Europe and South America. In the U.S. the corn is a symbol of summer, consumers know the names of their favorite varieties, and each summer there are popular articles on the growing and preparation of sweet corn (Tracy, 2001).

Sweet corn is one of economical plants in Thailand which is grown in Chiang Mai, Rathchaburi, Burirum, Supanburi etc. (Katenin, 2002). It is differentiated from other types of corn by gene or genes that alter endosperm starch synthesis, which affect eating quality such as flavor, tenderness, sweetness and texture; appearance of ears and plants and seek viability. Therefore sweet corn has a more sugary test and it uses as a vegetable (Tracy, 2001, Punpung, 2002 and Cobbledick, 1997). Sweet corn is a good source of starch in diet which providing energy. Its protein is more nutritional value than rice. Sweet corn contains the pigment carotene from which the human body can produce vitamin A (retinol), of which serious deficiency is found in some tropical populations (Masefield *et al.*, 1973). Nowaday, researchers recommended that people increase in fruit and vegetable consumption for replacing food with high in fat and calories (Makhlouf *et al*., 1995; Health and Welfare Cannada, 1992). It is also recognized that a substantial portion of vitamins, minerals and fiber in the human diet comes from fruits and vegetables (Klein, 1987).

Corn milk is one of food products in the market that consumers accept for its taste, smell, freshness, and convenience for drinking. In addition, its taste like milk and it is good for health. Moreover, it is a source of vitamin C (ascorbic acid) and A (retinol) in form of carotenoid. Vitamin A (retinol) is an antioxidant which consists of lutein and zeaxenthin. Both of these compounds can resist the eye's disease from ageing (Luang-arun, 2003). Additionally, it has been found that unsaturated fatty acid in corn milk is higher than in cow milk for example linoleic acid. The unsaturated fatty acid in corn milk is about 57.4 %.

The disadvantages of pasteurized and sterilized corn milks are inconvenient for transportation, difficult to shipping weight, large area for keeping, easy for microorganism's growth because of its high moisture content, and need low temperature for storage. Drying methods can be used to reduce these problems which occur in the pasteurization and sterilization products. Therefore the aim of this study is to investigate an appropriate method for the production of corn milk powder by foam-mat drying. The foam–mat drying is one of the interesting drying methods because dehydration is rapid, the color and flavor are superior because of minimal heat damage, the product is a free – flowing powder, capable of instant rehydration in cold water, and the process is achieved with minimal cost (Falade *et al*., 2003). Chandak and Chivate (1974) found that the foam-mat drying is a very short process therefore the rapid-volatile compound is more remain in food products than a spray drying method. Moreover, the foam-mat method can be used for a food product which has a high sugar content. For other drying methods, there are some problems concern with browning reaction during the process and a high cost of production (Ratchaniyom, 2002).

A production of corn milk powder will give an extra benefit for sweet corn farmers in the future. These farmers will get a better value for their vegetable crop by selling them to food industries. Beside that, the farmers can also have a constant demand from the industries through a contract. In addition, the foam-mat method that is used in this research can be applied for small-scale industries. The advantage of this drying method means that the success of the project will make a new business opportunity for small-scale enterprises. The establishment of these enterprises will not only create jobs for Thai people, but it will also support the Thai's economy in the future.

1.2 Purpose of the study

1. To determine the suitable amount and concentration foaming agent to produce corn milk powder by foam-mat drying.
2. To determine the suitable drying time and temperature in a tray dryer to produce corn milk powder by foam-mat drying.

1.3 Education / Application Advantages

1. The study will increase the value of sweet corn by increasing its product diversification.
2. The study will provide a more convenient way to store an agricultural product for
   a longer time.

1.4 Scope of study

This study investigated the suitable amount and concentration of a foaming agent, and time and temperature drying in a tray dryer to produce corn milk powder by foam-mat drying. A sweet corn variety of ATS-2 that was harvested on 55-60 days after planting the seeds was used in this study.