



CHAPTER I

INTRODUCTION

Fructose syrup is a new sweetener produced from starch using a multiple enzyme-conversion process. It is like invert sugar only made from starch instead of from sucrose. In recent years the production of fructose syrup has increased tremendously. As an illustration, production figures of fructose syrup in the U.S. were around 1.1 billion pounds in 1975 and 4.4 billion pounds (dry substance) in 1976 (1).

Because of the widespread use of maize for starch production in the U.S., this type of starch is naturally chosen as the raw material for the production of fructose syrup (2). In certain geographic areas however there is an interest in processing also starch from other sources than maize such as wheat, tapioca and potatoes. In Thailand, cassava is one of the principal crops and can be grown easily in abundance (3). The acreage and production of cassava roots is shown in Table 1-1 (4). Production of cassava roots and tapioca products are shown in Table 1-2(4). The domestic consumption of tapioca flour include usage in textile, paper industries, and manufacture of sweets, monosodium glutamate, glucose and medicinal capsules (3).

It is therefore the intention of this research project to study the methods of producing fructose syrup from tapioca flour using enzymatic processes.

Table 1-1 Acreage and production of cassava roots in Thailand (4)

Year	Acreage, rai	Root production, ton wet weight	Average Production kg/rai
1975/1976	3,715,000	8,100,000	2,180
1976/1977	4,373,374	10,138,000	2,318
1977/1978	5,999,886	12,371,000	2,062
1978/1979	6,313,191	15,048,000	2,384
1979/1980	5,240,000	10,600,000	2,022
1980/1981	6,340,000	14,600,000	2,302
1981/1982	6,610,000	14,540,000	2,200

Table 1-2 Production of cassava roots and tapioca products (4)

Items	million ton/year					
	1975	1976	1977	1978	1979	1980
Cassava roots	8.1	10.1	12.4	15.1	10.6	14.6
Export tapioca flour	0.2	0.2	0.22	0.22	0.22	0.22
Domestic tapioca flour	0.15	0.15	0.15	0.15	0.15	0.15
Tapioca chips and pellets	2.54	3.34	4.22	5.3	3.5	5.1

The sequences of investigation to study the production of fructose syrup from tapioca flour are as follows:

1. Review literature on methods of producing fructose syrup.
2. Select the analytical method for determining fructose content in fructose syrup.
3. Investigate factors affecting the production of glucose syrup from tapioca flour.
4. Study the pre-treatment of glucose syrup affecting the production of fructose syrup.
5. Determine various factors affecting the isomerization of glucose to fructose.
6. Study the post-treatment of fructose syrup.

The advantages that may be derived from this research work are as follows:

1. Promote the usage of tapioca flour to produce more valuable and useful products.
2. Evaluate whether the tapioca flour is a potential source of raw material in the production of fructose syrup.
3. Induce establishment of home scale or industrial scale of syrup industry in Thailand.