



CHAPTER I

INTRODUCTION

1.1 Introduction

The ratio of animal feed and the human consumption of protein versus total protein on the diet vary considerably from one part of the world to the other. According to recent estimation of FAO, 1.1 thousand million people are presently suffering from protein malnutrition in the Third World. The world population will reach 6.5 thousand million at the end of the century. The most of the increase will take place in the poorest countries which are already starving. Therefore, the production of protein should be multiplied by 1.5 to maintain the world food production standards at the present level. It is estimated that from now to the year 2000, the demand for feed protein will be multiplied by 1.8, Table 1 (Hoshiai 1983; Senez 1979).

Table: 1.1 Prospects of protein demand

Year	1980	2000	Increase factor
World demographic and conomical trends*			
Population (million)	4400	6405	1.46
G.D.P. (US \$, 1977)	1165	2071	1.78
Protein demands **			
Human consumption	48.6	78.4	1.61
Animal feeding	43.1	106.3	2.47

* Data from UN (1977)

** Million tons crude protein (data from Hoshiai 1978)

1.2 Single cell Protein production

Since protein demands of the world increases very rapidly, many intensive researches have been attempted toward combating the problem of deficiency in food production. One major development is in the area of production unconventional protein foods with emphasis to the production of microbial protein or single cell protein (SCP). Over the years, many interest has remained very high in utilization of starch rich plant material (wastes starch, potato, cassava etc.) as a substrate for yeast production. Cassava is one of starch rich plant material that are produced in many parts of the world. In 1982 the world's cassava production was at 129 million tons. Latin America contributed 24.2 %, about 37.7 % was produced in sub-Saharan Africa. Tropical Asia (including China) represented about 38% of world's cassava production. In that time, Vietnam produced about 3.323 million tons of cassava and Thailand has a production of cassava about 21 million tons (FAO Production year book, 1982) and Cassava product was used as animal feed more than 1.2 million tons per year.

Many workable processes are known, most of them based on the principle of starch hydrolysis with mineral acid followed by conventional yeast propagation. In this case, the substances produced by acid hydrolysis are only partly assimilable, the extent determining the yield of yeast. Besides of these, the use of strong acids required the use of corrosion resistance equipment.

In order to have both reactions take place in the same fermentor, mixed culture of an amylolytic microorganism and non-amylolytic producer have been used in the process to produce SCP.

In the present work, a mixed culture of *C. utilis* and *E. fibuligera* was study for the production of SCP from starch of cassava chips.

1.3 Objectives

The objectives of this research are :

1. To determine factors influencing the production of SCP from cassava starch such as mixing time of the two yeasts, ratio of molasses to cassava and the maximum concentration of starch used in the symbiotic cultivation.
2. To determine the operating conditions for SCP production from cassava starch in a 60 litre reactor.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย