

## Chapter I

### INTRODUCTION

#### 1.1 Importance of Parboiled Rice

Parboiled Rice is exported in large quantity compared with the other types of rice exported from Thailand. The comparison is shown in Table 1-1<sup>(1)</sup>. Export of parboiled rice has a tendency to increase in the future, and it makes more and more income to Thailand every year; see Table 1-2<sup>(1)</sup>. So, we can see that parboiled rice is a very important product for Thailand. The production process of parboiled rice should be developed to improve its quality and quantity for competition in the world export market with other countries such as U.S.A, Italy, India, Burma, Pakistan, and Malaysia.

#### 1.2 Advantages of using Fluidizing Technique

At present the most parboiled rice production in Thailand is done in conventional rice mills and small scale farms without any scientific technique. Especially in drying step, wet parboiled paddy is dried by spreading on large paved yards attached to the rice mills. This drying technique has so many disadvantages as follows:

1. it requires a very large area to make the yards.
2. it needs so much money for first investment in making large paved yards.

Table 1-1 The Statistics on Types of rice exported  
from Thailand in 1977

Type of rice	Quantity (ton)	F.O.B. Value (Baht)
Cargo rice	42,270	195,263,600
White rice	1,778,026	8,114,865,600
Parboiled rice	600,395	3,075,834,187
Broken rice	400,718	1,390,401,500
Glutinous rice	142,075	527,949,900
Rice for ship stores	432	1,425,051
Rice in the husk or paddy	150	262,837
Glutinous rice in the husk or paddy	42,467	76,828,301

Table 1-2 The Statistics on Parboiled Rice exported  
from Thailand from 1970 to 1977

Year	Quantity (ton)	% Export *	F.O.B.Value (Baht)
1970	266,588	25.06	613,174,347
1971	366,475	23.25	651,295,872
1972	346,678	16.41	656,096,273
1973	144,870	17.07	678,592,502
1974	147,417	14.32	1,272,060,287
1975	338,070	35.54	1,866,101,554
1976	318,361	16.13	1,419,910,307
1977	600,395	20.38	3,075,834,187

\* Percentage of parboiled rice exported based on total quantity of rice exported.

3. the quality (% moisture content) is not constant for each lot of rice, depending upon the weather conditions.

4. a large number of workers required for spreading, turning, mixing, and moving the paddy.

So, the problems which shown above should be solved. Fluidization Technique is the good one that can be applied to use in studying the improvement of drying. By using this technique, the quality and quantity of parboiled rice production are improved as follows:

1. percent moisture content of rice can be controlled and will resulted in uniform quality in every lot of production.
2. it can be produced at any quantity required.
3. production is independent of the weather conditions.
4. the efficiency of production is increased.

The results of present study can be scaled up for industrial production which lead to develop parboiled rice production in Thailand.

### 1.3 Purpose and Scope of Research

The purpose of the present work was to design and construct fluidized bed column for drying parboiled paddy for both batch and continuous types. After installation of the equipment the mechanisms of the system was studied. The experiment was performed to find the relationships of time, % moisture content, and the rate of drying. Effect of air inlet flow rate, air inlet temperature, and production rate were also studied.