

CHAPTER 1

INTRODUCTION

Rice milling quality is a major determinant of paddy prices in the world markets. Milling quality is determined by the quantity of total milled rice and the percent head rice that can be produced from a unit of rough rice (Jongkaewwattana, 1990). Head rice is grain that remains whole completely or by at least $\frac{3}{4}$ of the whole grain after the milling processes. Generally speaking, high quality milled rice has low percentage of broken kernel and high percentage of head rice. There is report which indicated that rice milling quality as expressed by percentages of head rice in Thailand are still very low (Siamwala and Na Ranong, 1990) as compared with other rice growing countries such as USA. that generally have the percent head rice approximately 61-67% (Jongkaewwattana, 1990).

Presently, rice breeders begin to pay more attention toward grain quality besides high yielding characteristics of rice plant (Opastrakul, 1996). Many studies have been conducted to investigate factors affecting rice grain quality. These include (a) plant factors such as genotypic and grain characteristic (Juliano, 1972; Khush *et al.*, 1979; Jongkaewwattana, 1990); (b) field management eg. time of harvesting, nitrogen application and water management, (Jongkaewwattana, 1990); (c) post harvest factors such as drying methods (Wright and Warnock, 1983), milling system (Esmay *et al.*, 1979; Camacho *et al.*, 1978) and rice parboiling (De Datta, 1981).

In order to address these variations, Chiang Mai Valley was selected as study site to identify factors related to yield and quality of rice grains. Chiang Mai Valley located at the upper north region of Thailand. It's a major rice producing area in Thailand which approximately 484,711 rai in 2000/01 (OAE, 2001). In this region, there are different in rice managing systems of growers. These differences reflect the impact of various factors on yield and quality of rice as previously reviewed.

Besides head rice yield, nutritive value of rice grain is also referred to rice quality. Among the major nutritional problems prevalent in rice-consuming countries, inadequate and unbalanced dietary intake is the most important one. In combination with other compounding factors, it leads to widespread prevalent of protein-energy malnutrition, nutrition anaemia (particularly from iron deficiency), vitamin A deficiency and iodine deficiency disorder (FAO, 1993). Iodine is one of an important element that is generally low in rice grain. It is essential for fetus development, normal physical and mental activities in adult. When body iodine stored are exhausted, it leads to various illnesses which are known as iodine deficiency disorders (IDD). This includes hypothyroidism, goiter and cretinism. If the body intakes iodine content less than 50 μg per day will induce deficiency (Smyth, 1993; Ghent and Eskin, 1993). Iodine deficiency disorder is prevalent in many rice-eating populations, particularly in mountainous regions (Chong, 1979 ; Khor, Tee and Kandiah 1990). In the north and northeast of Thailand, iodine deficiency disorders have been recognized since 1953. The first survey conducted by the Nutrition Division with WHO supervision revealed IDD prevalence among school children as high as 90 % in some areas (Pruenglampoo *et.al.*,1995).

Recently there is study which demonstrated that the application of potassium iodide on rice plant is the alternative way to enhance iodine content in rice grain (Pruenglampoo *et al.*, 2000). They also reported that using potassium iodide either by direct application of KI into the soil or by spraying onto plants produced positive effect on grain yield by reducing the percent of unfilled grain yield and improved the percentage of head rice. Similarly, Chankruayat (2000) revealed that foliar application of potassium iodide, which contain iodine in a very low concentration (0.1 g. per 100 ml. of water) had significant positive effect by increasing head rice yield particularly when applying weekly starting from PI (panicle initiation) till anthesis stages. Besides, it also increased iodine content in brown rice.

In order to further investigate the effect of KI application on milling quality and nutritive value of rice grain, detail study on KI application i.e. spraying frequency and its concentration were focused in this study. The objective of this research were:

1. To describe relationship between various rice managing systems of growers in Chiang Mai Valley and yield as well as milling quality.
2. To investigate the effect of potassium iodide (KI) application on rice yield, milling quality and nutritive value in various rice growing systems.
3. To study the effect of potassium iodide application rates and frequency of foliar application on yield, milling quality and nutritive value of rice grain.