

CHAPTER I

INTRODUCTION

1.1 Introduction

Thailand is an agricultural country and one of the main agricultural products is rice. Thailand is ranked number 1 rice exporter in the world markets; in fact, the country is ranked number 6 in world production. It has been estimated by Ministry of Agriculture and Co-operatives, Government of Thailand, that the production of paddy will be about 25 million tons in the year 2002.(1) Paddy consists of 67% of rice, 5–8% of bran and 25–28% husk in average. As a result, a large amount of by-product or waste in form of rice husk is generated from rice milling. Until now, rice husk has been mainly used as fuel in the electricity production.(2) By-product or waste of these utilizations is rice husk ash (RHA) and every year millions of ton of RHA is resulted. Rice husk contains ash from 13-29% by weight depending on variety, climate and geographic location.(3) The RHA is largely composed of silica (~90 wt%) and about 5 wt% of non-burnt out carbon with small amount of alkalies and other trace elements. This kind of wastes is difficult to dispose because of its bulkiness. There are several applications of RHA such as utilization of RHA in cements (4-5), production of silica from RHA (6-7) and substitution of quartz by RHA in whiteware ceramics.(8-9) However, until now there is an abundance of waste RHA not utilized in the country and RHA is not so widely used especially in ceramic field. Therefore, in this work we are interested in the application of RHA in ceramic body, especially in terra cotta flower pot.

Terra cotta ceramics are the hard unglazed brownish-red earthenware made from red plastic clay firing at low (700-900 °C) to medium (1000-1100 °C) temperatures. The terra cotta ceramics contain plastic clay as the main raw material. The plastic clay is very sticky and will stick on machines during the mixing or forming processes. Moreover, the green body has very low drying rate due to the nature of plastic clay. Generally, these problems can be solved by addition of non-plastic materials such as silica sand and grog (fired clay) in the composition of terra cotta body. However, silica sand and grog are the costly materials and we can not add much amount of silica sand into the

composition due to the transformation of quartz during the firing process as it may cause cracking. Moreover, the improvement of the production process may cause the shortage of grog too. So we are interested in the substitution of these materials by waste or cheaper materials.

From the composition of RHA as mentioned, RHA will be used as an additional material to reduce the plasticity of clay as well as enhance the drying rate of terra cotta body, because RHA is non-plastic material. However, before using RHA in the terra cotta production we have to know the effect of RHA on both dried and fired properties of mixed terra cotta body. Therefore, in this thesis we study the effect of RHA on the physical properties of terra cotta body in order to know the properties of RHA mixed terra cotta body before applying in the real production.

1.2 The objectives

1. To study the effects of rice husk ash on the dried properties of terra cotta ceramic body.
2. To study the effects of rice husk ash on the fired properties of terra cotta ceramic body.
3. To find the proper ratio between clay and rice husk ash for use in the terra cotta ceramic production.