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DRYING OF PARBOILED PADDY USING PROFILE CONTROL AND DETECTING MOISTURE PLACEMENT

A dissertation submitted to the

Department of Electrical Engineering, University of Moratuwa

in partial fulfillment of the requirements for the

degree of Master of Science

by

University of Moratuwa, Sri Lanka.
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DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, nor concurrently submitted for any other degree.

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We endorse the declaration by the candidate.

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Abstract

In developing countries, post-harvest losses destroy about 15 -16 percent of the rice crop. This figure is even as much as 40 -50 percent in countries where there are challenging natural events and climatic conditions, such as regular heavy monsoons. Some stages in the rice post-harvest system are more critical than others, particularly drying and storage. Rice millers and farmers are beginning to understand and accept the need to invest in post-harvest technologies not only because these technologies are now affordable, but also because they offer the potential to increase profits by adding quality and commercial value to the final products. Placement of moisture in the paddy seed is critical while drying. Traditionally, human experts determine the temperature and duration of drying to keep the proper moisture distribution within the paddy seed. It is known that, properly dried paddy will yield much higher output after the hulling and milling process.

The major considerations of this design are reducing the quantitative and qualitative losses which could occur during the drying of parboiled paddy rice. This study includes the design of a temperature profile controlled LSU (Louisiana State University) type dryer with details of the methodology, and design of the components to detect moisture placement in paddy seed which could in turn used to determine the temperature and duration of drying.

A reduction of two percent of milling loss is achieved by temperature profile control. It is established that the moisture placement can be determined using capacitive and resistive moisture sensors. A correlation between capacitance and resistance to moisture placement in paddy is determined by carrying out trials with human experts. Linguistic variables and the actions taken to control temperature and drying time are established in this study. As further improvements a fuzzy logic based approach is discussed to simulate the human decisions.

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Throughout my childhood I always dreamt of building something extraordinary, discovering something helpful to human being. During the past years it always kept on back of my mind. Now that the time has come, I have given the abilities, resources and the knowledge, it is time to revive. By passing this knowledge I gained by doing this research, I hope to improve the standards and profits of rice millers and farmers in Sri Lanka.

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