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EVALUATION OF DIFFERENT TYPES OF RICE FLOUR MILLING MACHINERY FOR THEIR PERFORMANCE

by

D.M.S.P Bandara

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This thesis was submitted to the Department of Mechanical Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Degree of Master of Engineering in Manufacturing Systems Engineering

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DECLARATION

This Dissertation paper contains no material which has been accepted for the award of any other degree or diploma in any University or equivalent institution in Sri Lanka or abroad, and that to the best of my knowledge and belief, contains no material previously published or written by any other person, except where due reference is made in the text of this Dissertation.

I carried out the work described in this Dissertation under the supervision of Dr. U.P Kahangamage

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THE EVALUATION OF DIFFERENT TYPES OF RICE FLOUR MILLING MACHINERY FOR THEIR PERFORMANCE

ABSTRACT

A study was conducted to evaluate the performance of four types of rice flour milling machinery currently used in Sri Lanka namely, pin (disk) mill, plate mill, roller mill and hammer mill. The machines were evaluated for their performance with a view to recommending the suitable machinery or machinery combination for the Sri Lankan rice flour milling industry. Their performances were evaluated in terms of particle size obtained after milling, temperature increase during milling, moisture content of milled rice flour, string continuity on extrusion and cost of production.

The pin mill performed best as a single machine among the four types of rice flour milling machinery. However, the particle size of rice flour obtained was 300μm, which is inadequate for the preparation of extruded products. A combination of three passes through the pin mill produce a particle size of 212μm and the flour was suitable for extruded products after preparation of dough with warm water at 60 °C. The temperature increase during milling, the moisture content of milled rice milling and cost of production per kg of rice flour by this combination are 56.3^0C, 11.7% and LKR.2.57 respectively. The study also showed that rice flour produced by a combination of pin (two passes) and plate mill (single pass) is suitable for extruded products after preparation of dough with water at ambient temperature as well as warm water at temperature 60 °C. The temperature increase during milling, moisture content of milled rice flour and cost of production per 1kg of rice flour by this combination are 59.5^0C, 12.3% and LKR 2.84 respectively.

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