

PERFORMANCE EVALUATION OF SMALL SCALE DRYER FOR PARBOILED PADDY

H.M.T.M. Dharmasena¹, B.D.M.P. Bandara Dissanayake² and
G.V.T.V. Weerasooriya¹

¹ *Department of Agricultural Systems, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka*

² *Institute of Post Harvest Technology, Jayanthi Mawatha, Anuradhapura*

Parboiling is a hydro-thermal treatment given to the paddy before milling and an old practice followed in Sri Lanka. The popular method of drying parboiled paddy is sun drying. Under tropical climatic conditions, high rainfall seriously affects the sun drying observation. Therefore, further development is necessary to improve the mechanical drying systems. In this study, the performance of a small scale batch type deep bed dryer was evaluated for parboiled paddy, designed and fabricated at the Institute of Post Harvest Technology in Anuradhapura. This research study describes the dryer performance in terms of drying temperature, time, capacity efficiencies and quality of dried rice after milling. Parboiled paddy was dried in the small scale dryer with forced air at 45°C and also under sun drying. Dried grains were milled under the unique machine conditions and subjected to qualitative analysis. It was found that the fuel (fire wood) consumption of the dryer was 12kg/hr. The lowest drying time (3hrs 10 minutes) and highest average drying rate (6.39 %/hr) was obtained at 70kg capacity in dryer while the highest drying time (5hrs 10 minutes) and the lowest average drying rate (3.92%/hr) was observed at 140kg of capacity. The fuel consumption efficiency and drying efficiency were negatively correlated with capacity of the dryer. The highest percentages of cracked grain (11.87%) and broken grain (13.5%) were obtained from sun drying whereas the lowest percentage of cracked grain (3.23%) and broken grain (5.58%) were observed with 140kg capacity in dryer. It was also observed that there was a positive correlation between percentage of cracks and percentage of broken grains

during milling process. Results were further indicated that the milling yield and grain discoloration between sun drying and small scale dryer were not significantly different. This study concluded that, better grain qualities can be obtained in this mechanical dryer than sun drying. Although it has a disadvantage of higher fuel cost, dryer is very important especially in rainy season, when it is impossible to practice sun drying. Further, considering the results it can be concluded that 105kg is the most appropriate dryer capacity to achieve optimum performances in drying of parboiled paddy.

Key words : Parboiling, Hydro-thermal, Drying, Performance