

Thesis Title	Paddy Drying by Two-Dimensional Spouted Bed Technique
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Abstract

The objective of this research is to design , construct and test a lab-scale two-dimensional spouted bed (TDSB) , to develop an empirical drying rate equation in correlation with temperature , holdup and spouted width. Paddy quality such as relative head yield and whiteness of paddy were also investigated.

Entrance height of 10 centimeters was assigned for the experiment according to the preliminary , tested result showing minimum power consumption of fan. Also minimum air flow rate for spouted bed , $0.079 \text{ m}^3/\text{s}$ (13.17 m/s) was selected for the experiment. Drying of paddy with moderate initial moisture content of 24-26 percent dry basis was observed at temperature 100 , 125 and 150 degree Celsius , holdup 10 , 15 and 20 kg and spouted width 6 , 8 and 10 cm. Moisture content of paddy after drying was 20-21 percent dry basis or 16-17 percent dry basis.

The drying rate correlation was explained by Page's equation [$\text{MR} = \exp(-A t^B)$] which constant values A and B were analyzed by using first-order and second-order polynomial equations. The developed equation agreed well with the experimental results and was valid for

temperature 100-150 degree Celsius , holdup 10-20 kg , spouted width 6-10 cm and paddy's initial moisture content 24-26 percent dry basis.

Relative head yield at 16-17 percent dry basis was 28.14-73.95 percent depended on temperature (decreased by increasing of temperature). At 20-21 percent dry basis , relative head yield was 84-85 percent at drying air temperature of 100-125 degree Celsius and was 59.95 percent at 150 degree Celsius while the influence of holdup and spouted width were not significant. The effect of cycle time on head rice yield was not significant. In terms of whiteness , temperature , holdup and spouted width had no effect. Paddy's whiteness was in the range of 45-50 percent which was close to the reference whiteness 40.63 percent.

Keywords : Drying / Grain / Quality / Spouted Bed