

Thesis Title	Study of Industrial Scale Paddy Drying by Fluidization Technique
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Abstract

The objectives of this research were to investigate the appropriate operating condition of industrial scale paddy drying by fluidization technique and compare the result to that of paddy dried by using thermal energy from cyclonic rice husk furnace and diesel burner. Specific primary energy consumption, drying cost and rice quality were considered and analyzed.

In case of using diesel burner, the air recycle ratio of 45 - 60% was found to be the optimum condition which offered the lowest specific primary energy consumption in range of 5 - 5.7 MJ/kg-water evaporated. Total drying cost was 1.61 Baht/kg-water evaporated. It was divided into fixed cost 0.19 Baht/kg-water evaporated, diesel oil cost 1.17 Baht/kg-water evaporated, electrical cost 0.19 Baht/kg-water evaporated and maintenance cost 0.06 Baht/kg-water evaporated. In case of using cyclonic rice husk furnace, thermal efficiency of rice husk furnace system was 75%. Specific primary energy consumption was 9.3 MJ/kg-water evaporated. Total drying cost was 0.83 Baht/kg-water evaporated, which was divided into fixed cost 0.39 Baht/kg-water evaporated, rice husk cost 0.05 Baht/kg-water evaporated, electrical cost 0.29 Baht/kg-water evaporated and maintenance cost 0.1 Baht/kg-water evaporated. Using cyclonic rice husk furnace instead of diesel burner, the simple payback period was 1,176 h. The testing results of head rice yield, whiteness and cooking and eating qualities showed that rice samples after drying were not different from reference rice, good quality and had no problem for trading and eating.

Keywords : Dehydration / Fluidized Bed / Rice Husk Furnace / Rice Quality /