

Drying kinetics, energy consumption, and quality of paddy (MAR-219) during drying by industrial inclined bed dryer with or without the fluidized bed dryer.

ABSTRACT

The performances of industrial dryers, namely the inclined bed dryer (IBD) and the fluidized bed dryer (FBD) combined with IBD, in terms of drying kinetics, energy consumption, and quality of paddy were investigated in this study. Drying parameters used in a single-stage paddy drying using IBD and a two-stage drying using FBD combined with IBD were analyzed to assess the existing performances of the drying techniques. The overall performances of the current drying practices exhibited inconsistent results with the operating parameters, such as drying air temperature, drying time, and air flow rate among the drying process lines. Distinct variations in moisture reduction and energy consumption of the drying systems were identified. Poor performance of the industrial fluidized bed dryer was observed in the case of drying in low capacity that caused higher specific energy consumption. However, the quality of milled rice obtained from both drying systems was found to be almost similar. Minimal process time (i.e., up to 24.5% less) was found in the paddy dried with FBD as the first-stage drying, followed by IBD as the second-stage drying.

Keyword: Fluidized bed dryer; Inclined bed dryer; Rice quality