

Effects of Airflow Reversal in Fixed Bed Drying of Rough Rice on HRY and Drying Performance.

ABSTRACT

Conventional (single-direction airflow) fixed-bed drying of rough rice results in reduced grain quality from over-drying of grain in the bottom layers of the dryer. To address this problem, drying of rough rice with airflow reversal was studied for improving grain quality and drying performance. The results showed that airflow reversal drying increased drying capacity by at least 20% at every bed depth studied, compared to conventional drying. Increasing the grain bed depth also caused drying capacity to increase; however, doing so resulted in decreased head rice yield (HRV) and increased energy consumption. Depending on the grain bed depth and airflow rate, energy use was reduced by 12% to 32% in airflow reversal drying compared to conventional drying. Airflow reversal drying with a 50 cm grain bed depth was found suitable for achieving acceptable drying performance with the least quality loss. Overall results indicated that increases in fissure formation, with subsequent HRV reduction, could be avoided in airflow reversal drying provided that drying parameters were properly chosen.

Keyword: Airflow reversal; Drying, Drying capacity; Effective heat efficiency; Energy usage; Fixed bed; HRV