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Effect of process parameters on in-bin drying characteristics of high moisture paddy

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■ **ABSTRACT :** Appeal of in-bin drying is that the same bin can be used for drying and temporary storage of grains at farm level. Successful adoption of in-bin drying method needs careful research on conditions under which it operates. Effect of process conditions such as inlet air temperature, rate of air flow and bed depth on drying characteristics of high moisture paddy at 25% (wet basis) in cylindrical drying bin was studied. An experimental cylindrical drying bin was fabricated with false floor arrangement. Three factors three levels Box-Behnken experimental design was used for conducting the drying experiments. In total 17 experiments were performed at three levels of temperatures (50, 60 and 70 ^{0}C), air flow rates (0.2, 0.3 and 0.4 $m^3 s^{-1} m^{-2}$) and bed depths (22.5, 33.75 and 45 cm). Five response variables were investigated in this study *viz.*, drying uniformity in terms of moisture differential within drying bin, drying rate (kg $kg^{-1} h^{-1}$), moisture ratio, head rice yield (%) and germination (%) of paddy. It was observed that moisture differential along the height of bed was highly affected by air flow rate and bed depth. Drying of high moisture paddy in bin dryer occurred in falling rate period and no constant rate period was observed. Drying temperature 70 ^{0}C resulted in reduced head rice yield (33.7%) and germination (74%) of paddy.

■ **KEY WORDS :** High moisture paddy, In-bin drying, Process conditions, Drying characteristics

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