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垂直内挡板对流态化流体动力学及谷物干燥特性之影响

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摘要 The effect of vertical internal baffles on the particle mixing and grain drying characteristics in a batch fluidized bed column is investigated. Experimental work was carried out in a 3 m high rectangular fluidized bed dryer of cross sectional area of 0.15 m×0.61 m at different operating conditions using paddy, a group D particle, as the fluidizing material. The results of the study showed that the fluidized bed dryer system with vertical internal baffles gave better particle mixing effect in the bed of particles than that without vertical internal baffles. This is due to the fact that the vertical internal baffle act as gas bubble breakers by breaking up the large gas bubbles into smaller ones. The smaller bubbles cause a more vigorous mixing in the bed of particles before finally erupting at the bed surface. This improves the contacting efficiency and enhanced the heat and mass transfer of the fluidized bed system. Thus a higher drying rate was obtained in the falling rate period because the higher contactin efficiency increases the evaporation rate at the particle surface. However, the drying rate in the diffusion regio' shows little improvement because the moisture diffusivity does not depend on the contacting efficiency. The fluidized bed dryer with vertical internal baffles could therefore be used in the initial rapid drying stage in a two stage drying strategy for paddy. The insertion of vertical internal baffles into a fluidized bed system improves the processing of Group D particles ina fluidized bed system especially if the system is large in scale.

关键词 垂直内挡板 混合性 流体动力学 谷物 干燥特性 流化床干燥
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The Effect of Vertical Internal Baffles on Fluidization Hydrodynamics and Grain Drying Characteristics

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Key words bubble characteristics; vertical moisture content; drying curves; fluidization quality; fluidized bed dryer; group D particles; paddy

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