A NON-EQUILIBRIUM MATHEMATICAL MODEL FOR BATCH GRAIN DRYING IN TWO-DIMENSIONAL SPOUTED BED

Two-region, non-equilibrium model of two-dimensional spouted bed dryer has been developed. The model, based on heat and mass transfer interactions between the spout and the downcorner, predicts the air and grain temperature and moisture content throughout each thin layer of grain at unsteady state. The model consists of a set of four differential equations, applied for each layer. Validation of the model was made by comparing predicted and experimental data for batch corn drying. Simulation clarity the physics of drying and lead to the simplification assumptions reasonably used for the downcorner. Drying and heating process are shown to occur mainly in both of the spout and the downcorner regions. Overall, the errors between experiment and simulation were considered acceptable.