

## MODELING AND SIMULATION OF DEEP-BED GRAIN DRYERS

Johanner P. Sitompul,<sup>1,\*</sup> Istadi,<sup>2</sup> and I. N. Widiassa<sup>2</sup>

<sup>1</sup>Dept. of Chemical Engineering, Institute of Technology  
Bandung, Jl. Ganesha 10, Bandung, 40132, Indonesia  
<sup>2</sup>Dept. of Chemical Engineering, Diponegoro University,  
Jl. Prof. Sudarto, Tembalang, Semarang, 50239, Indonesia

### ABSTRACT

This paper concerns with heterogeneous modeling of deep-bed grain dryers based on two-phase model by taking into account coupled heat and mass transfer within grains. This model also consider axial mass and heat dispersion in the fluid phase. The dynamic two-phase equations are solved numerically by finite difference with alternating direction implicit method algorithm, and then applied to simulate humidity and temperature profile of drying gas across dryers together with moisture content and temperature of grains. The capabilities of these models were compared with experimental data obtained from available literatures, under drying conditions such as temperature and absolute humidity of drying gas and moisture content of grains. The simulation results show that the dynamic of corn drying within the bed is well predicted by the two-phase model.

---

\* E-mail: johanner@termo.pauir.itb.ac.id