Numerical Simulation of Warm-air Drying of Mexican Softwood (Pinus Pseudostrobus)

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Abstract

In this work, the numerical simulation of Mexican softwood (Pinus pesudostrobus) drying is presented by solving a phenomenological model. The model was developed by considering the heat and mass balance in the representative elementary volume, which involves the solid, liquid and gas phases. We solved a system of partial differential equations by numerical factorization in COMSOL multiphysics 3.4©. Three primary variables were solved: the moisture content, the temperature, and the dry-air mass. The numerical results were compared against both experimental data and a semi-empirical model (Characteristic Drying Curve) previously published. The warm-air drying of Mexican softwood was simulated on a one-dimensional basis. The liquid water, water vapor pressure, dry-air density and moisture evolution at different depth of wood thickness display a good reliability of our numerical results.

Reference

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