

Abstract Submitted  
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**Numerical PDE Coupling for Water Vapor Transport in Baled Corn Stover**<sup>1</sup> ALEXANDER RASMUSSEN, JEAN-FRANCOIS VAN HUELE, Brigham Young University — Drying baled corn stover is of interest to those in biofuels and agriculture research at Idaho National Laboratory. Dried bales are significantly easier to process in ethanol producing plants, easier to transport, and experience less dry matter loss. We investigate water transport inside a corn stover bale using analytic models and a numerical model of coupled PDEs. Heat exchange between water vapor and liquid water in the bale is considered along with effects from cellular respiration: oxygen diffusion and consumption, heat generation, and liquid water production. Boundary conditions and initial conditions are considered for ambient temperature, oxygen concentration, and humidity. COMSOL Multiphysics allows for high levels of complexity in the model, but as complexity increases, convergence to a solution becomes unreasonably long—changing from minutes to weeks.

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A.J. Rasmusson  
Brigham Young University

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