**Stress-crack initiation during drying of corn kernels: a hybrid mixture theory based porous media approach**

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A three-scale fluid transport model was used to study moisture transport and stress-development in corn kernels during drying. The multiscale approach allowed studying viscoelastic stress development in biopolymers coupled with fluid transport from cellular to tissue scales. The three-dimensional kernel structure was captured using micro-CT scanning and imported into the numerical software package. The experimental drying profiles were predicted with reasonable accuracy (=0.88-0.99 and CV=3.5-9.5%). During simulations, the region with highest moisture content was observed to be away from the geometric center covering parts of soft-endosperm and germ. The high moisture flux was observed under the pericarp, in soft-endosperm toward top and in region connecting soft-endosperm and germ. The germ due to its lower moisture diffusivity in comparison to hard and soft endosperms, retained higher moisture and exhibited lower moisture flux. With the aid of intermittent drying simulations fan on/off strategies were developed that can be easily implemented by the farmers and industry to obtain corn kernels with fewer stress cracks and less energy expenditure during drying.