

## **Transient Mass-size Distribution Model to Predict the Performance of Biomass Grinding Operations**

L. Jafari

### **Poster**

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Biomass from forestry and agricultural sources has recently drawn a lot of attention as a new source of feedstock for energy and bio products. Size reduction is an important step in preparation of biomass as a feedstock. Each conversion process needs its own specific size or size distribution of particles. Modeling the size reduction process helps to optimize the design and control of the process while ensuring biomass particle sizes for an efficient biofuel conversion process. The objective of this study was to apply population balance method for modeling the size reduction process. The model was applied to switchgrass size reduction using a cutter mill. Two population balance parameters, grinding rate ( $s^{-1}$ ) and breakage distribution function (dimensionless) were estimated using experimental grinding data. The time dependent balance equations were solved using the Euler technique. The accumulation and depletion of the particles belonging to each size category were simulated as a function of time. The simulation predicted the residence time of particles inside the grinder in a way that the ground particles could meet the size and size distribution specifications for the downstream process.