Abstract

A constitutive model (i.e., stress–natural strain and strain rate relationship) was developed for predicting and characterising the compression behaviours of corn stover and switchgrass grinds. The constitutive model characterised the biomass as an elasto‐visco‐plastic solid through five model parameters: elastic modulus, strength coefficient, strain hardening exponent, viscous coefficient, and frictional loss factor. The constitutive model parameters were found to be affected by the densification conditions (i.e., pressure, particle size, moisture content, and preheating temperature). During compression of biomass grinds, the development of structure of the compact inside the die was captured by the elastic modulus. Also, the elastic modulus and viscous coefficient correlated with the compressive strength and durability of briquettes made from corn stover and switchgrass at various densification conditions.