

5th Forest Engineering Conference

Contribution 74 in session “Fuelwood quality and moisture content management“

Energy efficient production of high quality wood chips using energy round wood instead of forest residues

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Keywords: wood chip production; energy round wood; forest residues; fuel quality; energy consumption; ISO 17225-4; ash content; elemental composition; particle size distribution; image analysis

Fuel qualities of wood chips and energy consumption during their production vary depending on raw materials and machine settings. Thereby, requirements for small combustion units, e.g. low amounts of fines, overlong particles and low ash contents, are rarely met.

Numerous wood chip samples were collected in the field ($n = 34$) and during stationary experiments with four chippers (two drum, one disc and one cone, $n = 60$). Raw materials derived from different tree species (forest residues and energy round wood). Chipper settings varied in knife sharpness, screen size, cone shape, infeed-roller speed and discharge systems. All samples were analyzed according to European standards. In addition, particle size distribution and particle form were analyzed using a continuously measuring image analysis device. Classification followed ISO 17225-4 (draft). Fuel consumption during chipping was recorded and related to volume and weight of the bulk material.

During field trials, ash content of wood chips ranged from 0.4 to 1.8 m.-% for energy round wood and from 1.0 to 5.4 m.-% for forest residues. Only 30 % of all samples could be classified as “graded wood chips” (ISO 17225-4) and requirements were usually met using energy round wood and sharp knives. Moreover, particle form strongly related to knife sharpness. Specific fuel consumption during chipping ranged from 0.17 to 0.76 l/lcm and was high for forest residues, small screen sizes or blunt knives.

Results from field trials could be enhanced during stationary chipping experiments allowing for further insight into energy efficient wood chip production.