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BEHAVIOUR OF *Miscanthus* AT CUTTING SHEAR WITH STRAIGHT KNIVES WITH DIFFERENT EDGE ANGLES

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Abstract

This paper presents some experimental results regarding mechanical behaviour at shear cutting *Miscanthus x giganteus* stem with an oblique blade of different edge angles. Experimental determinations were performed using samples of about 30 mm in length and a medium diameter of about 6.3 mm to 8.9 mm. The biomass was cut with three bevel cutting blades of 30 degrees, with a tool angle of 10, 30 and 50 degrees, fitted on an equipment used for mechanical experiments type Hounsfield, with a working speed of 500 mm/min. Using QMat program force-deformation graphics for each sample were saved. The results are shown through force-deformation graphics obtained during testing and also shown through geometric parameters influence of stems on the cutting process. The specific cutting force values were between 31 and 34 N/mm, for the bevel cutting angle between 10 and 50 degrees, and the specific cleavage energy between $(13.07 - 47.07) \times 10^3 \text{ J/m}^2$, confirming the results in the field. The energy consumption for cutting a hectare of *Miscanthus* crop is situated between 0.55 - 1.35 MJ/ha, calculated for 75 plants per square meter. Mechanical behaviour of *Miscanthus x giganteus* plant is necessary to be known for specialists in order to design equipment's with an optimum function process, for dimensioning and projecting harvesting and grinding biomass (*Miscanthus*) equipment's in order to minimize energy consumption or to grow the working capacity of the machines.

Key words: mechanical behaviour, *Miscanthus x giganteus*, oblique angles, shear cutting tests

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