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

Georgiana Moiceanu*, Paula Voicu, Gigel Paraschiv, Gheorghe Voicu

University “Politehnica” Bucharest, Faculty of Biotechnical Systems Engineering

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) x10^3 J/m², 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 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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* Author to whom all correspondence should be addressed: e-mail: moiceanugeorgiana@gmail.com