Mechanical properties of miscanthus rind : relation to tissue structure and composition

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Understanding the mechanical properties of lignocellulosic biomass is of great interest to improve their deconstruction (eg in the pre-grinding operation unit), and their functionality for different applications (eg biomaterials). Ten highly contrasted *Miscanthus sinensis* genotypes were selected based on their overall cell wall composition to cover the variability available within this species, and were harvested in two consecutive years. The rinds from the fifth internode were prepared and the shear force required to cut them was obtained using a dedicated prototype device. Based on the measured mechanical properties a subsample of rinds or associated internode were selected and characterized for histology (by light microscopy after FASGA staining or scanning electron microscopy) and cell wall biochemistry (neutral sugars, Klason lignin, hydroxycinnamid acids). A large variability was revealed for composition and structure (rind thickness and density) allowing to explain differences in the observed mechanical properties.