**Small-scale fiber composition analysis combined with NIR calibration models for predicting cell wall components in biomass crops**

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To date, conventional wet chemistry methods available for determining structural carbohydrates and analyzing fiber composition of biomass are time consuming and not cost effective. With the demand of Biofuel production, the industries are in need for methods that help them rapidly test biomass crops regarding the cell wall components, to be able to predict the biofuel production potential. The present method provides a small-scale wet chemistry process for biomass composition analysis combined with near-infrared (NIR) spectroscopy to achieve a rapid and cost effective prediction of lignocellulosic compounds in biomass crops. The method relies on downscaling the starting amount of sample material for pre-treatment and hydrolysis by 43x the amount used by conventional methods (300 mg) without compromising the results. In comparison with traditional method, e.g. NREL, less sample material is used and with a precise scale, centrifuge and HPLC, comparable results were achieved. The small-scale analysis was evaluated in triplicates using the reference sample RM 8491 sugarcane bagasse provided by NIST with reported values of 23,3%, 40,5% and 22.04% of lignin, cellulose and hemicellulose respectively and the results obtained are 23.8%, 39.8%, 21.8%, within the uncertainty range reported. The NIR spectroscopy is a correlative technique where spectral data from samples collected are correlated with their reference values obtained with a robust analytical method. Regression techniques are employed to mathematically develop a model, subsequently downloaded into the NIR spectroscopy instrument. The NIR calibration model is capable of predicting values for future samples only by being scanned. The combination of the developed small-scale method and NIR calibration model provides a reliable sample data prediction that substitutes the tradicional wet chemistry method eliminating time and cost consumption.