



SUNLIBB

Sustainable Liquid Biofuels from Biomass Biorefining

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Deliverable 1.5

“Novel refined NIRS-based models for the HT analysis of cell wall composition in maize”

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Workpackage: **1**

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SUNLIBB deliverable 1.5

Objective:

The objective of this deliverable is to establish high-throughput methods to quantify composition and structure of lignocellulosic biomass in maize. NIRS (Near-Infrared Reflectance Spectroscopy) prediction equations establishment is an approach that fulfills this objective.

Results:

This deliverable was delayed: NIRs predictions had been previously planned at Lusignan INRA station for this project. Unfortunately, research activities on maize at this station stopped in 2011. NIRs equations were transferred from Lusignan to Versailles and predictions for cell wall components were obtained on plant materials from the SUNLIBB project (Table1).

In addition, novel NIRS predictive equations have been established for cell wall related traits and biomass degradability (Table2) using selected samples from SUNLIBB field trials carried out in France during the SUNLIBB project (2011-2013).

Discussion /Conclusion:

NIRS predictive equations were set up by P6 (INRA) using a selected set of SUNLIBB samples harvested in 2011, 2012 and 2013. Although this deliverable was delayed, there were no knock-on effects on other deliverables. Quality criteria of these equations were good, allowing us to accurately characterize maize lignocellulosic biomass.

Methods	Parameters	Units	N	Range		Quality criteria		
				min	max	R	SEC	SECV
Extraction	CWR	%	41	48.6	86.6	0.98	1.69	2.30
Klason	LK/CWR	%	50	10.29	18.67	0.94	0.62	0.92
Thioacidolysis	H	$\mu\text{mol.g KL}^{-1}$	50	3.0	21.4	0.82	2.57	3.65
	G	$\mu\text{mol.g KL}^{-1}$	50	132.2	340.3	0.86	22.40	37.50
	S	$\mu\text{mol.g KL}^{-1}$	50	119.6	370.2	0.98	11.40	38.20
	H+G+S	$\mu\text{mol.g KL}^{-1}$	50	255.1	676.5	0.94	28.90	64.64
	S/G		50	0.62	1.64	0.75	0.15	0.18
Alkaline hydrolysis	Pc est	mg.g^{-1} CWR	45	4.7	18.8	0.91	1.30	1.74
	Fe total	mg.g^{-1} CWR	45	5.7	8.8	0.90	0.32	0.46
	Fe est	mg.g^{-1} CWR	45	3.4	6.5	0.80	0.36	0.46
	Fe eth	mg.g^{-1} CWR	45	2.0	3.5	0.67	0.28	0.31
cellulolysis	CELWL	%	41	28.0	61.2	0.98	1.54	1.83
	CELSR	mg.g^{-1} CWR	41	146.7	417.2	0.98	15.60	18.71
	CELGLU	mg.g^{-1} CWR	41	113.6	248.9	0.96	10.10	15.19

Table2: Characteristics of novel NIRS predictive equations established.