



**Celignis**  
**Analytical**

**With Accurate Data  
the Opportunities  
are Limitless...**

Pitch Perfect

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# Celignis Biomass Analysis Lab



- Dedicated analysis laboratory for the bioeconomy.
- Based in Limerick, Ireland.
- Spin-out from university research and EU biofuels project.
- Focus on catering to the needs of the bioeconomy.
- Launched 2014 → experience (15 yrs).

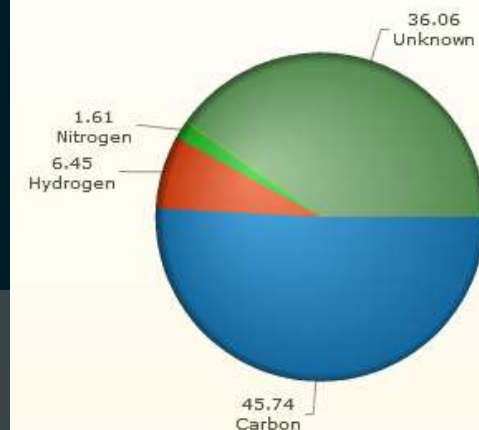
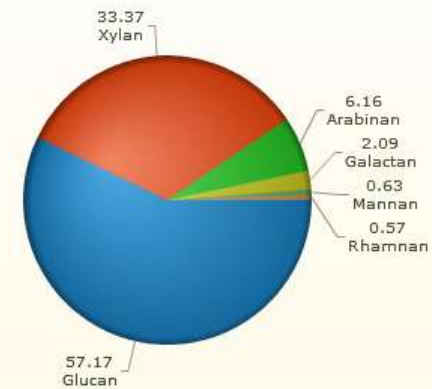
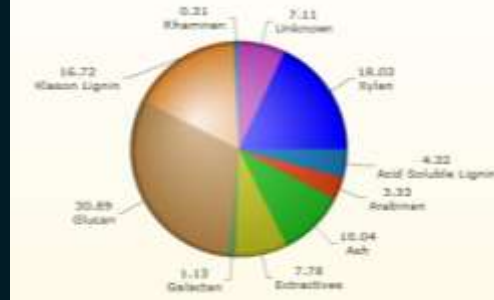


# Services:



## 1. Analysis for Biorefineries

- Hydrolysis process (e.g. enzymatic).
  - Cellulose content (structural glucose).
  - Hemicellulose content (constituent sugars).
  - Lignin content (acid soluble and insoluble)
  - Extractives
  - Ash.
  - One-day analysis with our NIR models.
- Enzymatic hydrolysis tests.
- Thermochemical (e.g. pyrolysis).
  - Elemental analysis (C, H, N, O, S)
  - Heating value
  - Ash, anions and cations.



# Services:



## 2. Process Liquids Analysis

- Analysis of liquid products of pre-treatment and conversion.
- Can determine the amounts of each sugar that are in the oligomeric form (e.g. LHW pretreatment).
- Can characterise anhydrodisaccharides, uronic acids, sugar alcohols, sugar degradation products (e.g. furfural, HMF, levulinic acid etc.).
- Fermentation tests and analysis for products.

## 3. Marine Biomass

- “3<sup>rd</sup> generation biofuel”.
- Carbohydrates in seaweed.
- Mannitol, fucose, glucuronic acid, mannuronic acid, guluronic acid.
- Amino acids in seaweed.



## 4. Thermal Properties

- Proximate analysis.
- Ultimate analysis.
- Heating value.
- Chlorine content.
- Ash and ash composition.
- Ash melting temperature.
- Also look at physical properties (e.g. particle size distribution of wood chips).



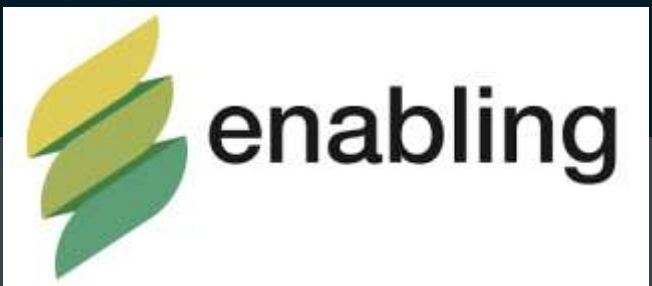
## 5. Anaerobic Digestion

- Biochemical methane potential.
- Analysis of composition of the biogas.
- Digestate analysis.
- Detailed lignocellulosic analysis of feedstock and process residues allows greater understanding of efficiency of digestion.



# Horizon 2020 Projects

- **BIOrescue:** BBI (2015) focuses on valorisation of spent mushroom compost.
- **UNRAVEL:** BBI (2017). Project on biomass pre-treatment with Celignis's focus on the characterisation, removal, and recovery of biomass extractives.
- **ENABLING:** RUR (2017), Supporting the spreading of best practices and innovation in the provision of biomass for the Bio-Based Industry



*"One-day analysis of biomass"*

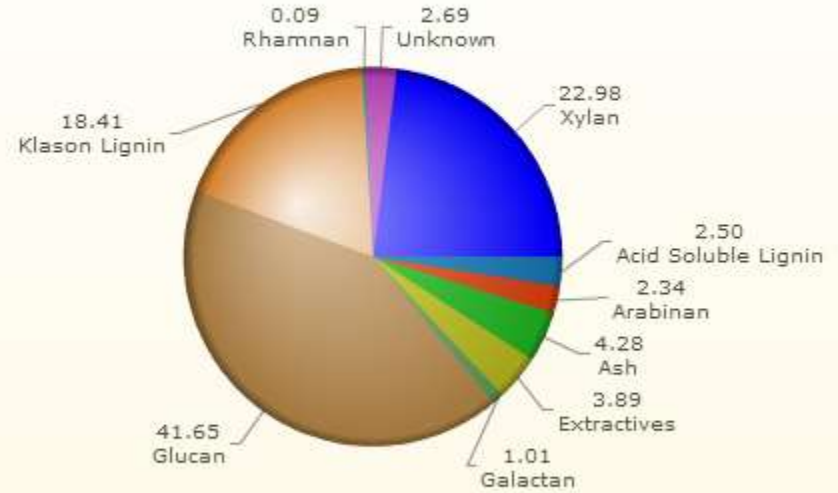




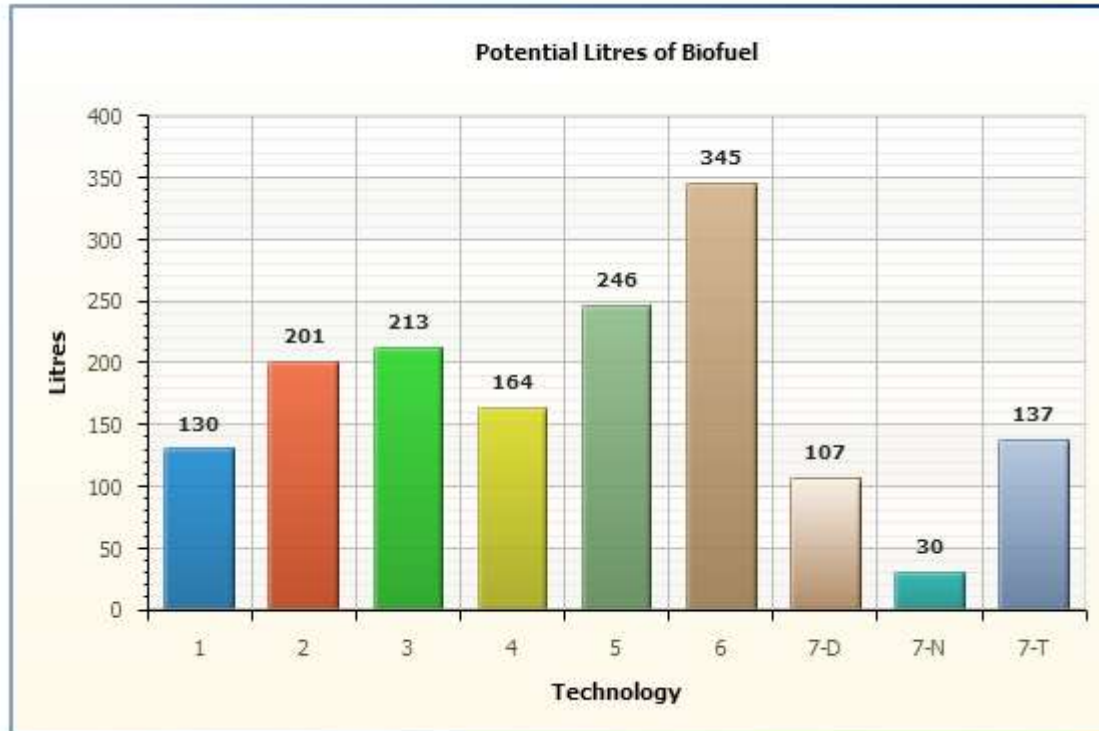
## Individual Sugars

	Glucan	Xylan	Arabinan	Galactan
<b>Wet-Chemical Data (% Dry)</b>				
AV.	41.65	22.98	2.34	1.01
Rep 1	41.70	22.99	2.31	1.01
Rep 2	41.61	22.97	2.36	1.01
SD	0.06	0.02	0.04	0.00
<b>Near-Infrared Predicted Values (%)</b>				
Pre.	41.97	23.39	2.27	0.99
Dev.	1.28	0.70	0.24	0.00

### Pie Chart for Mass Constituents



- [View Yields Chart](#) [Pie Chart](#) [Sugars Chart](#) [Yields Chart](#) Miscanthus leaf #2
- [View Yields Chart](#) [Pie Chart](#) [Sugars Chart](#) [Yields Chart](#) Sugarcane bagasse #2
- [View Yields Chart](#) [Pie Chart](#) [Sugars Chart](#) [Yields Chart](#) Compost #2
- [View Yields Chart](#) [Pie Chart](#) [Sugars Chart](#) [Yields Chart](#) Compost #3
- [View Yields Chart](#) [Pie Chart](#) [Sugars Chart](#) [Yields Chart](#) Bark #1



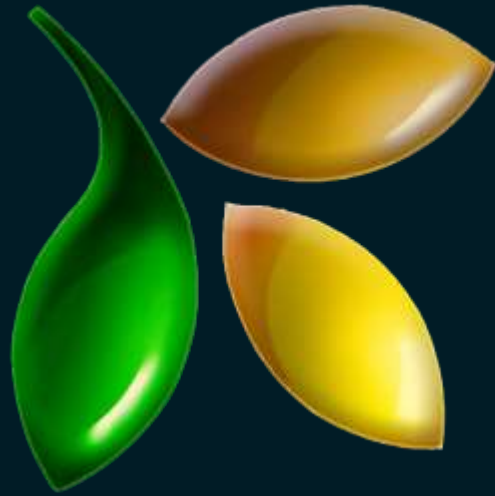
5.2	9.5	9.9
2.5	4.3	3.9
4.2	22.3	5.3
2.2	25.8	2.4
0.9	3.1	5.2

# BioBase4SME

- Funding for SMEs in developing their company.
- Vouchers available, 50% from EU programme with possibility of national bodies providing remainder of costs.
- Services:
  - Techno-economic evaluation.
  - LCA.
  - Business planning.
- Now Celignis's analytical services available via TCBB.



*“One-day analysis of biomass”*



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**Thank You!**

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