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# CELISE 2022 meeting

## WP1: Biomass processing

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# Objectives

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- Transfer of knowledge about sustainable lignocellulosic processing
  - To obtain cellulose pulp, biochar and fibres from biomass residues. In addition, energy production in rural areas obtained from the rest of fractions (lignin, hemicellulose) will be also studied.
  - The best characterisation methods will be also analysed.
  - In addition, two workshops about pretreatment methods and novel fibre production in SMEs and applications will be carried out, mainly for younger researchers.
- Create knowledge about
  - (i) novel characterisation methods of lignocellulosic materials by HPLC and FTIR;
  - (ii) novel hydrolysis and biochar production processes using deep eutectic solvents and hydrothermal processes;
  - (iii) joining processes for second-generation of ethanol production; and
  - (iv) new fibre bio-products from cellulose materials and natural additives.
- Skill development for biomass processing and characterisation in SMEs and rural areas.



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# Tasks and secondments done

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- Task 1.1. Characterisation methods and residues.

(Leading by LS-IWC) **M03-M11**

**Oskars Bikovens from LS-IWC did a secondment at UCC (Universidad Cooperativa de Colombia):**

- To choose the best raw materials for production of cellulose materials based on cocoa production waste (cocoa pod husk, mucilage and bean shell, cocoa tree pruning) available in rural and vulnerable areas in relation to their characterization and opportunities of business and considering the availability of the raw materials.
- To give recommendations about the best characterisation methods in lignocellulosic biomass for obtaining cellulose based products.
  - Learning techniques and methods about biomass residues
  - Meeting with the UCC biorefinery research group. Visit of UCC labs in Medellin, Bucaramanga and Bogota and partners labs (University of La Sabana, Chia, Bogota; Universidad Santo Tomas, Bogota; Francisco José de Caldas Universidad Distrital, Bogota) in Colombia.
  - Discussion with researchers Oscar Felipe Arbelaez Perez (UCC, University of Antioquia) about lignocellulose material using.
  - Introduction to growth and production of cocoa at Agrosavia (Cacao research centre, Santander department).



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# Tasks and secondments done

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- Task 1.2. Novel and sustainable hydrolysis processes as pre-treatment.  
(Leading by UC) **M03-M17**

Carlos Burgos from UNACH (Universidad Nacional de Chimborazo) did a secondment at UC:

- Study of different hydrolysis processes in the biomass residues chosen in task 1.1. Acid, alkaline, deep eutectic solvents, steam explosion and autohydrolysis was used as pre-treatment step to separate cellulose from lignin and hemicellulose.
  - Technical expertise in pre-treatment of lignocellulosic biomass
  - Technical expertise in chemical reactors for biomass
  - Analysis about the main fractions in lignocellulosic biomass
  - Assistance in the co-supervise by proof-reading a MSc thesis in biomass at the host department.
  - Meetings with UC Archives staff to discuss insights and ideas on the use of cellulose-based products from waste paper materials as a writing medium.
  - Meetings with the companies Dromedario and MARE



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# Tasks and secondments done

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- Task 1.3. Energy production in rural areas.

(Leading by SGGW) **M04-M23**

Fernando Colmenares from UCC (Universidad Cooperativa de Colombia) did a secondment at UC:

- To study energy demand and biomass energy production possibilities in rural areas.
- Contribution to the deliverable D1.3 Production of cellulose fibres, biochar, biofuels and energy to be used in SMEs and rural areas
  - Assistance in the co-supervise by proof-reading a MSc thesis in biomass at the host department.
  - Cooperation in research networks and working relationships with the GER group
  - Meetings with the companies Dromedario and MARE.
  - Meetings with UC Archives staff to discuss insights and ideas on the use of cellulose-based products from waste paper materials as a writing medium.
  - Meeting with Prof. Dr. Alberto Coz from the University of Cantabria met near Santander, Spain with Dr. Rebeca Alonso Santurde from the company Bondalti, there they were discussing about circular economy and the use of waste generated by the same company that is dedicated to chemical processes, exploring opportunities for collaboration and cooperation between industry and academia.
  - In the framework of the International Fair Trade Day, Prof. Dr. Fernando Colmenares and Dr. Alberto Coz attended the talk and coffee and cocoa tasting organised by the University of Cantabria with the Primos de Origen project.
  - Working sessions to finalise details of the doctoral thesis tutoring of Carlos Burgos from UNACH



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# Tasks and secondments done

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- Task 1.3. Energy production in rural areas.

(Leading by SGGW) **M04-M23**

Alberto Coz from UC did a secondment at FICH-UNL (Universidad Nacional del Litoral):

- To study energy demand and biomass energy production possibilities in rural areas. Contribution to the deliverable D1.3 Production of cellulose fibres, biochar, biofuels, and energy to be used in SMEs and rural areas.
  - Study of the production of bioproducts by different fermentation and waste materials using multi—criteria analysis
  - Learning techniques about the fermentation steps and fermenters for lignocellulosic materials
  - Learning techniques about other pre-treatment steps for lignocellulosic materials
  - Learning other techniques about mathematical modelling for lignocellulosic processing (more related to WP2)
  - Skills about rural waste materials in Argentina, Brazil, and Uruguay
  - Different visits to other laboratories at the UNL.
  - Meeting with the FICH-UNL about the analysis of individual compounds by HPLC
  - Visit to the laboratories of LATU, Montevideo, Uruguay
  - Visit to a farm-school in relation to rural areas
  - Visits to a big beer factory and a small enterprise of craft beer



# Tasks and secondments done

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- **Task 1.4. Production of biochar and applications.**

**(Leading by LUT) M08-M24**

No tasks has been done

- **Task 1.5. Production of fibres and applications.**

**(Leading by INOCURE) M08-M39**

No tasks has been done



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# Tasks and secondments done

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- Task 1.5. Production of fibres and applications.  
(Leading by INOCURE) **M08-M39**

Oskars Bikovens from LS-IWC did a secondment to UCC:

- To give recommendations of the best nanocellulose and cellulose fibres methods.
  - Related to a future paper and collaboration.



# Deliverables, Milestones and deadlines

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Number	Title	Beneficiary	Type	Dissemination level	Deadline
D1.1	Recommendations about characterisation methods in lignocellulose biomass	LS-IWC	Report	Public	M11
D1.2	Pre-treatments of lignocellulosic residues to be used in SMEs and rural areascooperation	UC	Report	Public	M17
D1.3	Production of cellulose fibres, biochar, biofuels and energy to be used in SMEs and rural areas	SGGW	Report	Public	M39

Number	Title	Beneficiary	Deadline
MS1	Fibre material prototypes	BANGOR	M39



# Future work

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- **Next secondments on January – Velta Fridrihsone (LSIWC-INOCURE)  
Jakub Klaban (INOCURE-LSIWC)  
Dominika Hanusova (INOCURE-LSIWC)**
- **First workshop about biomass pretreatment methods – when and where?**
- **Completion of deliverables D1.1. and D1.2.**
- **At least 3 open access publications for next year**
- **Realize a larger number of secondments – in the 1<sup>st</sup> year, 4 of 16 planned secondments were realized.**