

EUCalyptus Lignin VAlorisation for Advanced Materials and Carbon Fibres

Project number 745789

D7.4 Meeting Minutes of Main Project / Consortium meetings 2

Due date of deliverable: 29/02/2020

Actual submission date: 03/03/2020



"This project has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 745789"

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PROJECT INFORMATION

Project full title: EUCAllyptus Lignin VALorisation for Advanced Materials and Carbon Fibres

Acronym: EUCALIVA

Call: H2020-BBI-JTI-2016

Topic: BBI-2016-D03


Start date: September 1st 2017

Duration: 42 months

List of participants:

Participant No.	Participant Organisation Name	Short Name	Country
1 (Coord)	Contactica S.L.	CTA	Spain
2	Envirohemp S.L.	ENV	Spain
3	Grado Zero Innovation S.R.L.	GZI	Italy
4	Biosensor S.R.L.	BIO	Italy
5	Sächsisches Textil Forschungs Institut e.V.	STFI	Germany
6	Tampere University of Technology	TUT	Finland

DELIVERABLE DETAILS

Document Number:	D7.4
Document Title:	Meeting Minutes of Main Project / Consortium meetings 2
Period:	09012017- 02282021
WP:	WP7. Project Management
Task:	Task 7.3 Overall management of the project based on KPIs tool and BSC methodology
Author:	CONTACTICA S.L. 
Abstract:	This deliverable collects the minutes from the different meetings carried out till February 2020 within the project. For each Consortium meeting attendants and minutes are included. In the personal meetings (General Assembly meetings) the agenda and main outputs are also presented.

1. 3rd General Assembly meeting

DATE AND TIME	EVENT	PLACE
8 th – 9 th October 10:00 – 16:00h 9:00 – 11:30h	3 rd General Assembly meeting	TAU facilities (Tampere, Finland)

1.1 ATTENDANTS TO REVIEW MEETING

	ORGANISATION	NAME
1	CONTACTICA	Carolina Alfonsín
2	CONTACTICA	Nuria Valdés
3	ENVIROHEMP	Jon Solar
4	GZI	Enrico Cozzoni
5	STFI	Petra Franitza
6	STFI	Marcel Hofmann
7	TAU	Johanna Lahti
8	TAU	Petri Johansson
9	TAU	Arja Puolakka
10	BIOSENSOR	Daniele Zappi

1.2 AGENDA

1.2.1 Day 1 (8th October 2019)

- 10:00 – 10:15 **Welcome**
- 10:15 – 12:00 **Visit to TAU facilities**
- 12:00 – 13:00 **Lunch**
- 13:00 – 13:35- **WP1**. Optimization of the lignin recovery from paper industry's black liquors (**GZI**). Tasks and deliverables (started, finished, deviation and problems). Next 3 months.
- 13:35 – 14:10 – **WP2**. Manufacture of Carbon fibre mats from high-purity lignin (**GZI**). Tasks and deliverables (started, finished, deviation and problems). Next 3 months.
- 14:10 – 14:25h – **WP3**. Technical validation of the production of biobased products (**ENV**). Tasks and deliverables. Next 3 months.
- 14:25 – 15:00 **WP4**. Benchmarking, Prototyping and Standardization of the biobased materials (**BIO**). Tasks and deliverables (started, finished, deviation and problems). Next 3 months.
- 15:00h – 15:30. **BREAK**
- 15:30h – 16:00h. LCA & LCC Analysis (**CTA**)
- 16:00 – 16:30h. **WP6**. Dissemination & Communication (**CTA & ALL**).
 - BBI Project's Day. Roll-up design

Group dinner at 7:00 PM (free adhesion) - Pyynikin Brewhouse restaurant, Verkatehtaankatu 2,
<https://www.ravintola.fi/en/ravintola/pyynikin-brewhouse/>

1.2.2 Day 2 (9th October 2019)

1. 9:00 - 10.00h. **WP5** Business Plan, Exploitation and market deployment of final biobased products (**CTA**).
Exploitation Board discussion: Potential patent, publications....
2. 10:00 -10:30H. Next 3 months: tasks, deliverables, milestones & KPIs progress (**ALL**)
3. 10:30 – 11:00H. **BREAK**
4. 11:00 – 12:00h. Risk management actions & discussion (**CTA, ALL**)
 - Review of risk table
 - **Next critical implementation aspects**
 - DoA deviations and actions to plan / agree (**WP Leader**), Impacts on other tasks (**WP leaders**), Changes in DoA if applied (**WP leaders**)
5. 12:00 – 12:15 Wrap-up, questions, and next meeting arrangement.
6. 12:15 End of meeting

1.3 MEETING MINUTES

1.3.1 Work Progress

1.3.1.1 WP1. Optimization of the lignin recovery from paper industry's black liquors

Enrico Cozzoni (EC) explains the progress of WP1 as GZI is the leader of this WP. In his explanation, objectives and tasks are covered. Regarding deliverables, D1.1 was submitted in June whereas D1.2, D1.3 and D1.6 will be submitted in M25. MS1 was achieved on M24.

However, MS2 should be changed as obtaining polyurethane (PU) had to be discharged and instead **lignin-derived (or based) Polyols will be obtained**. Polyol is an ingredient of polyurethane. At low concentration of lignin, it is possible to obtain PU using also other precursors, whereas it is difficult to get Lignin-derived PU materials with high Lignin concentration. Thus, complete replacement of Lignin to Polyol is a research focus. Lignin-based Polyols are potentially usable for obtaining PU foams also with increased thermal degradation (fire-resistant) properties.

Task 1.1 is finished. The extended characterisation of black liquors was done and the reports are being prepared. In parallel to this action, the study of residues is performed.

The extraction of lignin is being studied. There are two commercial alternatives to do it (LIGNOFORCE and LIGNOBOOST). LIGNOFORCE was used because it was easier to adjust some parameters such as typology of lignin or sulphur content. GZII can produce 2 different batches of lignin:

1. One batch similar to the lignin sent to TAU.
2. Low-Sulphur content lignin

Regarding the extraction, GZI needs a feedback from TAU to extract the best typology of lignin to carry out the spinning (WP2). EC asks TAU if the quality of the lignin sent was good, if some changes are needed and if TAU wants to try the low-sulphur lignin. EC asks TAU and ENV the quantity of lignin that they need to perform their tasks. After some discussion, it is decided that GZI will send 100g of low-Sulphur content lignin to TAU to do some tests.

EC points out that the extraction will not be finished and if more batches are required GZI can produce them.

The extended characterisation of lignin will be finished by M29 and TAU is helping in this task. The same tests will be done with the low-Sulphur content lignin.

Conclusions

- ➔ **Lignin (1 kg) coming from the set-up of the precipitation and filtration stages** - was ready in M21-M22 (May-Jun 2019), and sent to TAU (500 grams) & BIO (100 grams).
- ➔ **Lignin modification** was done in a small batch of 500 g producing Lignin with low Sulphur content in M24-M25 (Aug-Sep 2019)
- ➔ **Preliminary characterisation** of Lignin will be made in Oct-Nov 2019 (M26-M27)
- ➔ **Extended characterisation** of Lignin will be made only in Jan 2020 (M29) - activity shifted in WP2. TAU is supporting the Lignin characterisation in:
 - *Routine tests:*
 - a) Ash content
 - b) pH
 - *Extended characterisation:*

a) Thermogravimetric and calorimetric properties (TGA & DSC)

➔ **Bio-based Lignin-derived Polyols** are expected for M27 (Nov 2019)

1.3.1.2 WP2. Manufacture of Carbon fibre mats from high-purity lignin

EC explains the progress of WP2 as GZI is the leader of this WP. In his explanation, objectives and tasks are covered. Regarding the deliverables, D 2.1 and D2.2 will be submitted by M35 whereas D2.3 will be submitted by M37.

Regarding T2.3, carbonized Lignin was already produced and sent to WP4. Besides, carbonised Lignin was also produced according to the requests of WP4 and delivered to WP4 for testing in June 2019.

Johanna Lahti (JL), Petri Johansson (PJ) and Arja Puolakka (AP) explain the progress related to TAU tasks in this WP. TAU has begun with the spinning trials using the lignin provided by GZI: wet-spinning, melt-spinning and electro-spinning. Preliminary results from these three techniques are presented.

TAU asks what the tenancy STFI want to use is. STFI replies that tenancy is not a really important aspect for the processing, as the processing conditions are based on the fibre to be used. In addition, TAU asks about the dtex required and STFI replies that over 2 dtex is ok.

TAU does not know if the fibers are electric conductive so STFI will test them.

GZI comments that it is necessary to find a benchmark to be able to compare with EUCALIVA materials.

1.3.1.3 WP3 and WP4

Jon Solar (JS) from ENV explains that he is the replacement of Carlos Sanchis (the previous person in charge of the project). He explains briefly that this WP is delayed as ENV needs materials from other WPs to fulfil its tasks.

ENV has a doubt regarding the samples to reactivate. GZI answers that EUCALIVA goal is to produce functional application based on lignin. Consequently, ENV can think of the products to be prepared. ENV will receive non-woven fabric from STFI and ENV can receive a mesoporous fraction of lignin if wanted.

Daniele Zappi (DZ) from BIO explains what BIO has been carrying out regarding its work in WP3 and WP4. BIO is developing carbon ink based on carbon materials to substitute materials based on petroleum materials.

1.3.1.4 LCA & LCC Analysis

Carolina Alfonsín (CA) from CTA explains what a LCA and LCC are. She reviews each phase of the project indicating which partner has to give information.

Different partners will be receiving EUCALIVA materials to produce different products.

- ➔ STFI will produce non-wovens mats → STFI will send to GZI this material to be carbonised
- ➔ To ENV → non-wovens carbonised by GZI
 - lignin form GZI if ENV wants to do a reactivation test; in this case GZI needs to know the quantity as soon as possible.
- ➔ To BIO → Carbonised lignin from GZI
 - Lignin from GZI
 - Different compounds coming from lignin from GZI
 - Substrates that come from polyol

EC says that GZI has complete information regarding LIGNOFORCE. Next week it will be send to CTA.

CTA mentions that an inventory (LCI) will be prepared and sent to be completed by partners. This template will be sent next week.

CTA suggest performing the LCA & LCC from the biosensors as well.

1.3.1.5 WP6. Dissemination & Communication

Nuria Valdes (NV) from CTA explains the work done in PR1 concerning the WP6. NV explains that a new and easier method to upload documents to the webpage was implanted. Besides, the main points of the Communication and Dissemination plan are presented. At the end of the presentation, the collection of Communication & Dissemination actions (sent or mentioned to CTA) carried out until now, is shown, separating by partner and type of activity.

CTA mentions that due to the attendance of BIO and GZI to the BBI Project's Day, and following GZI proposal, a new roll-up and brochure need to be prepared.

GZI mentions that an article is being prepared by GZI and BIO.

GZI mentions some events that will be interesting to attend for EUCALIVA partners. These events will be in Sweden and Canada. In addition, CTA mentions that EUCALIVA was contacted to participate in a Conference. CTA will send the information regarding this event to the partners.

1.3.1.6 WP5 Business Plan, Exploitation and market deployment of final biobased products

NV from CTA explains what was done concerning WP5 until now. She mentions that task 5.1 and 5.2 are the only tasks ongoing. An updated version of the IP at this moment is shown. GZI asks to change its IP with new information. Consequently, a review of the IP to be protected is done.

GZI and BIO are preparing a Joint patent, as exploitation strategy for their shared IP. As a result, firstly they have to sign a Joint Agreement based on what it is included in the Consortium Agreement. Once the patent is published, they will publish the scientific article they are working with.

1.3.2 Risk management actions & discussion

NV reviews the risks of the project. Changes are included in the Risk Register and will be sent to the partners in its more updated version.

The BSC is reviewed too and changed with the help of GZI. The updated version will be sent to GZI so EC can include the new targets and the results obtained.

Based on the results of the first spinning tests, it is decided to focus on wet-spinning and melt-spinning. Electro-spinning is replaced by electrode fabrication (screen painting), as it is more in line with the products that are being obtained.

It is decided, based on the proposal of GZI, to have a meeting in a month basis, starting at the end of October. CTA will prepare a doodle to organize the following meeting. Besides, CTA will prepare a calendar with the meetings until December.

Test in ENV may begin around February. TAU will confirm in November this potential timetable as TAU has to send to STFI the materials.

In order to improve the quality of the material, as there is no similar product to be compared with:

1. Different test will be performed, with the help of some experts, to determine the size and the finishing agent of the fiber:

- a. TAU has tried only one precursor in the melt-spinning so another one must be tried → GZI will create a compound with a precursor so TAU can do the extrusion.
 - b. TAU needs to improve the wel-spining.
2. GZI wants to know if lignin can be used in 3D painting. So, GZI will be doing test with the compounds.

1.3.3 Wrap-up, questions, and next meeting arrangement

Next meeting will be in ENV facilities. The date has to be decided between the last week of March and the first week of April.

2 4th PCC MEETING

DATE AND TIME	EVENT	PLACE
25 th October 2019	PCC Meeting	Skype

2.1 ATTENDANTS TO THE MEETING

	ORGANISATION	NAME
1	GZI	Ludovica Cantarelli
2	GZI	Claudio Pucci
3	BIOSENSOR	Mehmet Turemis
4	BIOSENSOR	Giovanni Basile
5	BIOSENSOR	Daniele Zappi
6	CTA	Carolina Alfonsín
7	CTA	Nuria Valdés
8	ENV	Jordi Plana

2.2 MAIN OUTPUTS & ACTIONS

- CTA will ask STFI regarding the samples to be sent to TAU.
- CTA will meet TAU to start the data gathering necessary for the LCA & LCC.
- GZI will send samples to TAU the 28th of October.
- GZI will have an answer for NDA with BIO by the end of next week.
- GZI will send a doodle to ENV to organize a meeting next week.
- BIOSENSOR will start to modify the biosensors.
- BIOSENSOR will provide CTA data for the LCA.

2.3 MEETING MINUTES

2.3.1 Meeting introduction

Carolina Alfonsín (CA) from CTA welcomes the partners and informs that Petri Johansson from TAU is having some issues with the Skype connection so he will not participate in the meeting. Moreover, CA informs that STFI did not answer CTA to the invitation and they are not available in Skype for the meeting. Finally, CA remembers that the main aim of the meeting is to update the consortium about the activities performed by each partner from the last physical meeting in Finland.

2.3.2 Discussion and updates

CA transmits the concern of TAU because they did not receive the samples and the lignin that they are waiting from STFI and from GZI, respectively.

CTA comments that the next meeting will be held in ENV but the date needs to be decided.

Mehmet Turemis (MT) from BIOSENSOR also asks GZI about the samples which will be sent to them and CA adds that CTA also needs data about LIGNOFORCE and LIGNOBOOST processes to perform the LCA and LCC of the project.

Jordi Plana (JP) from ENV brings up to date about the last activities performed, mainly focused on looking for companies.

Daniele Zappi (DZ) from BIOSENSOR indicates that although they are waiting from material from GZI, they already have some material to start to modify the biosensors. Even so, BIOSENSOR expects to receive it by the end of October. Additionally, they will send CTA the requested data to perform the LCA.

Giovanni Basile (GB) from BIOSENSOR indicates that they have sent an NDA to GZI to proceed with the patent presentation and they are waiting for the signed document. It is important for them for the patent but also for pending publications.

Claudio Pucci (CP) from GZI presents in a Power Point presentation share by e-mail the last steps carried out by GZI. In the first slide he presents the deadline with the expected delays in the submission of documents. GZI indicated that the D1.2 and the D1.3 will be sent the 28th of October while the D1.6 will be sent the 25th of October. MT asks CP if the characterization will be done just for lignin or also for the rest of products. GZI thinks that just for lignin and MT clarifies that they already perform morphological characterization.

CP indicates that the samples of lignin with low sulphur content will be sent to TAU on the 28th of October since Ludovica Cantarelli (LC) is already arranging the shipping process. Additionally, GZI is organizing a Skype meeting with ENV next week to check benchmarking activities. They will send a Doodle invitation today. Finally, CP adds that the NDA with BIO for a patent is still under revision by its Administrative-Legal office and an answer is expected before the end of next week

CA and MT realize that deadline to receive the samples and data that both companies are waiting from GZI is not included in the GZI presentation. MT indicates that the information which they are mentioned is included in the minutes prepared in the last meeting. CP says that he will check it with Enrico and we will have a response from their side.

3 5TH PCC MEETING

DATE AND TIME	EVENT	PLACE
27 th November 2019	PCC Meeting	Skype

3.1 ATTENDANTS TO THE MEETING

	ORGANISATION	NAME
1	GZI	Enrico Cozzoni
2	BIOSENSOR	Mehmet Turemis
3	BIOSENSOR	Maria Teresa Giardi
4	BIOSENSOR	Daniele Zappi
5	CTA	Carolina Alfonsín
6	CTA	Nuria Valdés
7	ENV	Jordi Plana
8	TAU	Johanna Lahti
9	TAU	Petri Johansson
10	STFI	Marcel Hoffman
11	STFI	Petra Franitza

3.2 MAIN OUTPUTS & ACTIONS

- ➡ GZI is working on the missing deliverables.
- ➡ GZI will update the KPIs but the end of next week.
- ➡ GZI will send to CTA the information regarding the LCI of LIGNOFORCE
- ➡ GZI will give an answer about the NDA to BIO

3.3 MEETING MINUTES

3.3.1 Meeting introduction

Carolina Alfonsín (CA) from CTA welcomes the partners. Partner TAU has problems to connect through skype.

3.3.2 Discussion and updates

Enrico Cozzoni (EC) from GZI explains that he is preparing the BBI Conference to be held on 3rd December in Brussels. The new roll-up and the brochures were prepared for this meeting. Johanna Lahti (JL) from TAU may be joining EC in the BBI event.

TAU mentions that the melt-spinning samples were sent to STFI and BIO. Besides, TAU received the samples from GZI.

BIO asks GZI if it is possible to receive 50g of carbonised lignin in December. GZI asks for an email from BIO with this request. GZI will see if they can send more samples. GZI don't know if they have enough material.

STFI sent carbon samples to ENV. Besides, STFI has performed some trials.

ENV received the samples from STFI. In addition, they are in the process of hiring a laboratory technician as the previous one left. Consequently, laboratory work is stopped until this new person is found.

CTA will prepare the doodle to decide the date for the next EUCALIVA meeting at ENV facilities.

4 6th PCC meeting

DATE AND TIME	EVENT	PLACE
19 th February 2020	Internal Meeting	Skype

4.1 ATTENDANTS TO THE MEETING

	ORGANISATION	NAME
1	GZI	Enrico Cozzoni
2	BIOSENSOR	Daniele Zappi
5	CTA	Carolina Alfonsín
6	CTA	Nuria Valdés
7	ENV	Jon Solar
8	TAU	Johanna Lahti
9	TAU	Petri Johansson
10	STFI	Marcel Hoffman
11	STFI	Petra Franitza

4.2 MAIN OUTPUTS & ACTIONS

- ➔ GZI is working on the missing deliverables. D1.2, D1.3, D1.4 and D1.5 will be finished by the end of February.
- ➔ GZI will send new samples by the end of March.
- ➔ GZI will send to CTA the information regarding the LCI of LIGNOFORCE
- ➔ GZI will give an answer about the NDA to BIO
- ➔ The composites studies will be substitute by other studies such as stretchability test.

4.3 MEETING MINUTES

4.3.1 Discussion and updates

4.3.1.1 WP1

Enrico Cozzoni (EC) from GZI, updates the work done in WP1. They are working on the deliverables as 4 deliverables of WP1 are still pending.

EC mentions that they have an investor for developing specific lignin biobased products. I will extend the characterisation due to this investment. However, this situation has produced some delays. At the end of march, new lignin will be produce in a pilot plant that will have better characteristics.

Regarding the task 1.5, there is an issue in obtaining something similar to PU. Obtaining polyol was the only possibility but the quality of the samples is low. GZI is going to attempt using lignin to obtain this product instead of black liquors.

For the LCA, there is a problem to get the LCI for LiGNOBOOST as the oxidation step is patented. GZI is trying to figure out a range so CTA can use for the LCA.

4.3.1.2 WP2

TAU spinning tests are done for the moment. EC asks if it is necessary to carry out a second round of testing. Petri Johansson says that this depends on the results obtained by STFI, which implies studying the strength properties of the fibres. Petra Franitza comments that the tests (tenacity and fineness) are almost done. They will be finished in the following days.

Just in case, TAU has lignin left to carry out more tailoring if needed.

GZI will send the template for 2.1 to have contribution from the implicated partners.

STFI will send the non-wovens samples to GZI as a roll. STFI will send the samples next week.

4.3.1.3 WP3

The characterisation of lignin is done by GZI.

BIO tried to use the carbonised products sent by GZI to obtain an ink with the best performance. They have been working in designing stretchable circuits. BIO has been doing tests using Pusa binders. Consequently, BIO asks if GZI may be able to send the PU obtained to use them as binders in its experiments.

It was discussed in the meeting to substitute the part related to composites as there is neither time nor resources to do this study. It is more interesting to study electrodes and non-wovens as products.

CTA will write the PO to mention this decision and ask if an Amendment is needed. Besides, this situation will be mentioned in the RP2 reports.

Summarising:

- Task 3.1 will be focused on increasing the stretchability.
- Task 3.2 will be modified as composites will not be studied.

ENV is having some problems with the laboratory. ENV has to analyse the samples sent by STFI. GZI will send lignin to ENV so they can begin with the testing.

4.3.1.4 WP4

BIO is carrying out studies to determine the possible application of the inks. Currently, BIO is at the optimisation step. All the literature found is based on standard lignin and not carbonised lignin. Consequently, an optimisation is needed.

Regarding the LCA, the inventory of the processes is done. CTA is waiting for GZI data. GZI will send the data this week. A meeting between CTA and GZI to discuss LCA is proposed.

BIO will send an update to CTA as they have changed the solvent to a greener one.

D4.2 is delayed till April 2020.

4.3.2 Other issues

BIO is still waiting for GZI to sign the NDA related to the patent BIO is presenting. GZI says that they have revised the NDA and it will be sent to BIO so they can discuss.

In relation to the ink, if BIO wants to prepare a patent, GZI may be a co-owner of it. It is something that needs to be discussed.

GZI is going to give a workshop in relation to lignin characterisation in collaboration with a H2020 project. In addition, different Conferences are mentioned due to their interest for EUCALiVA partners.