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The **CelluWiz** project started in June 2019 and since the first newsletter in July 2020, significant progress has been made. In the past year, the partners of the project discussed several times by web meeting about the results and future orientation of the project.

As a reminder, the overall objective of **CelluWiz** project is to develop two processes able to produce an all-cellulose packaging material:

1. **The MFC wet lamination** process that allows the deposition of a thin layer of *Micro-Fibrillated Cellulose* on a paperboard and confers oil and oxygen barrier properties and
2. **The Chromatogeny grafting** process that aims at providing water and water vapour barrier to the MFC layer.

New Results

Chromatogeny grafting

Pilot process adaptation to MFC grafting

The Chromatogeny grafting on MFC wet laminated board aims at offering excellent barrier properties to water but also water vapour for the new developed packaging. Several pilot trials were performed in order to evaluate the influence of operating conditions on the grafting efficiency of the MFC layer. Some process upgrades were also assessed on the pilot leading to an increase of 80% of the grafted fatty acids on the MFC wet laminated board.

Figure 1: © CTP-Chezière
CTP's grafting pilot machine

Determining the relevant parameters in order to reach ultra-high grafting densities on MFC layers

The efficiency of the chromatogeny grafting is impaired by the high density of the MFC films and therefore so are the water and water vapour barrier properties. During this year, an original approach has been proposed at CERMAV in order to open the structure of the MFC film. Very promising results have been obtained in terms of accessibility of fibres, resulting in a higher grafting density (more than one hundred times higher) and excellent water barrier properties. As shown in Figure 2, SEM (Scanning Electron Microscopy) images revealed the fine structure of the opened sample, on which after grafting, water droplets really seemed to fly. Water absorption of the MFC film dropped to almost zero. Further work will be done to continue this investigation and find ways to adapt such method at chromatogeny pilot scale.

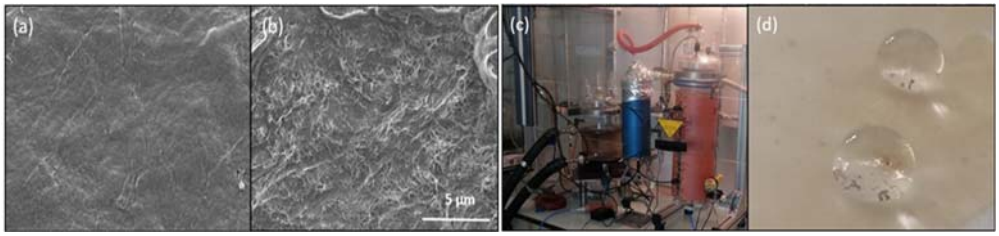

Figure 2: © CERMAV | SEM images of
(a) closed and (b) opened MFC films. (c) CERMAV's grafting process and (d) Drop test after grafting

Production of first proof of concept

Thanks to the combination of MFC wet lamination and chromatogeny grafting on board, the developed material has barrier performances that fulfill requirements for Clamshell application. This new material was therefore converted into Clamshell as explained in this video.

Material	$Cobb_{60}$ water [g/m²]	Kit test
Targeted Performances PoC1: Clamshell	< 20	> 10
MFC wet lamination and chromatogeny grafting – Pilot scale	16.4	11

Zoom on partners

The CelluWiz consortium **associates 6 partners from 4 European countries**: four research organizations and two industrial companies. The different partners will be presented through the different newsletters.

Cermav

CERMAV is a leading academic research laboratory in the field of Glycosciences in Europe and the activities of its five research teams respond to major societal challenges in the fields of human health, emerging energies and materials for new technologies. In addition, the unit makes an important contribution to training through research to prepare students and young researchers for the professional, industrial and academic world. In the Celluwiz project, CERMAV brings its know-how in the characterization and modification of cellulosic structures, relying on a set of scientific skills and state-of-the-art equipment to propose innovative solutions.

The research centre **ITENE** offers companies cutting-edge knowledge to transform the present and build a safer, more sustainable and digital future in four main areas: circular economy, efficient and safe packaging, safety, health and environmental monitoring and logistics and smart mobility. ITENE is working on the development of new and more sustainable packaging materials, carbon footprint analysis and eco-design, compostability or recyclability assessment, recycling technologies and waste recovery, as well as optimisation of packaging systems and logistics routes. With more than 25 years of experience, ITENE develops an intense research activity through R&D projects in order to transfer from the laboratory to the market innovative, scalable and competitive ideas with an integral vision of the whole value chain

Follow us!

The **CelluWiz** Consortium has been actively communicating with the public about the project progresses on LinkedIn, Twitter and on the CelluWiz project **website**. Presentations in international conferences were done. A video explaining the objectives of **CelluWiz** was released widely on social media. You have not seen it yet? Click here!

Many exciting results are still to come in the CelluWiz project, which will last until November 2022. Follow us on LinkedIn (@CentreTechniqueduPapier) and Twitter (@CommCTP) and stay tuned for the **next CelluWiz newsletter**!

Feel free to contact us if you have questions.

The Celluwiz Team