Telling the story of European Biotechnology

In Conference room,
3 Rue des Rouges Terres 51110 Pomacle,
on **September, 25th 2017** at 2 p.m.

CEBB:
COMPLEMENTARY COMPETENCIES FOR WHEAT BRAN VALORISATION

The European Center of Biotechnology and Bioeconomy (CEBB) is developing a unique methodology covering the whole bioeconomy value chain from the initial processing of biomass to end products, through continuous multidisciplinary dialogue between industry and researchers in material science and social sciences.

The researchers will present their work on **Monday, September 25**. This research seminar is part of the larger framework of the **European Biotech Week 2017** organised by **Europabio**. It will present the diversity and complementarity of the research conducted by the CEBB using the example of **wheat bran**, a local by-product.

As space is limited only registered participants will be admitted: **contact@cebb-innovation.eu**

PROGRAMME:

2 PM: Welcome address and introduction

2:30 PM: Nicolas BEFORT & Robin GODARD, **"Valorisation of by-products in a bioeconomy; an economic assessment of potential conflict between users and uses"**

3 PM: Caroline REMOND, **"ValBran: the valorisation of wheat bran into surfactant molecules"**

3:30 PM: Julien LEMAIRE, **"Purification of pentoses from wheat bran hydrolysates without neutralization for sulfuric acid recovery"**

4 PM: Florent ALLAIS, **"Enzymatic extraction of ferulic acid from wheat bran and its valorisation into high value-added (macro)molecules"**

4:30 PM: Testimonies of industrial and discussion

5:30 PM: Closing address and cocktail reception

ABSTRACTS OF THE PRESENTATIONS:

VALORISATION OF BY-PRODUCTS IN A BIOECONOMY; AN ECONOMIC ASSESSMENT OF POTENTIAL CONFLICT BETWEEN USERS AND USES

The development of non-food uses of plant-based products raises questions about the social utility of such production. A possible answer lies in the exploitation of waste and by-products, as witnessed by attempts to list usable resources, whether food waste, wood production waste, or by-products from the initial food processes, such as wheat bran. The development and use of these raw materials could lead to a conflict between partisans of traditional valorisations (such as animal feed) and new non-food valorisations. Our presentation describes a method of studying such disputes to identify potential types and levels of conflict.

VALBRAN: THE VALORISATION OF WHEAT BRAN INTO SURFACTANT MOLECULES

The ValBran project, started in January 2017, will develop original and environmentally friendly biotechnological and green chemistry pathways for the production of various surfactant molecules from wheat bran. Molecules with high added value for various applications (cosmetics, detergents, phytosanitary agents…) will be targeted. The approach will consist of developing several laboratory-scale transformation pathways and then selecting the most promising(s) for pilot upscaling in order to obtain economic and environmental impact of the developed process(es). Wheat bran residues generated during the process will be of interest for animal feed.

This project involves the University of Reims Champagne-Ardenne (FARE and ICMR units), the University of Picardie Jules Verne (GEC unit), the French competitiveness cluster “Industries des Agro-Ressources” (IAR) In Wallonia the University of Liège (AgroBioTech Gembloux, laboratory LBMI), the Walloon association ValBiom and the Greenwin cluster. In Flanders the project include the VITO research and technology centre, the INAGRO association and the Catalisti cluster.

PURIFICATION OF PENTOSES FROM WHEAT BRAN HYDROLYSATES WITHOUT NEUTRALIZATION FOR SULFURIC ACID RECOVERY

The agro-industrial sector generates large amounts of lignocellulosic by-products such as wheat bran which could be valorized into many chemicals and bio-based intermediates (sugars, paper pulp, surfactants, polymers or bioethanol). However, in the case of biomass hydrolysis by diluted sulfuric acid, current downstream processes involve a partial or complete neutralization which are not satisfactory for economic and environmental reasons.

This work presents a purification process of pentoses from hemicelulosic hydrolysates without neutralization for sulfuric acid recovery. Compared to conventional processes, less energy, water and chemicals are required. Very promising results were obtained at pilot scale with 150 L of wheat bran hydrolysates. The process is based on the combination of ultrafiltration, conventional electrodialysis and ion-exchange chromatography.

ENZYMATIC EXTRACTION OF FERULIC ACID FROM WHEAT BRAN AND ITS VALORISATION INTO HIGH VALUE-ADDED (MACRO)MOLECULES

Agricultural by-products, such as wheat bran, are rich in arabinoxylans which, after hydrolysis, can provide molecules for various uses: xylo-oligosides (prebiotics), xylose (xylitol), ferulic acid (vanillin, antioxidant). Hemicellulasic cocktails produced from *Thermobacillus xylanilyticus* on straw or wheat bran and used under various conditions have made it possible to release carbohydrates (mono- and oligomers) and ferulic acid. After its extraction from biomass, this ferulic acid was coupled with various other biosourced molecules to form polyphenolic structures leading to the optimization of its biological properties (antioxidants, antimicrobial). In order to develop an environmentally friendly synthesis, according with the principles of green chemistry and plant chemistry, the use of enzymatic catalysis was developed. Thanks to the combined use of (bio) catalysis and ferulic acid, new biosourced polyphenols with strong antioxidant and antiradical activities without any endocrine disrupting activity have been obtained. These molecules constitute credible alternatives to the current petro-sourced commercial antioxidants. These derivatives of ferulic acid have also been used as monomers, for the production of polymers (e.g., polyesters, polyurethanes without isocyanates) and phenolic resins, which can advantageously replace bisphenol A.

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