

PROGRAM MORNING

2nd ONLINE
CONFERENCE

18 May
2021

CIRCULAR ECONOMY: MAKE IT HAPPEN

09:00 Opening session

Luísa Magalhães — ASWP
*Aires Pereira — ASWP
Marta Coelho — SWYP

09:20 Case study - Silos de Leixões

Nuno Fernandes — Silos de Leixões

09:40 Pannel 1: Natural resources

Guilherme Ascensão (moderator)
University of Aveiro - RISCO

- Sustainable Autohydrolysis and Bleaching Processing for Cellulose Extraction from a Sugarcane By-Product

Francisca Casanova
Catholic University of Portugal - CBQF

- Application of Apple Cider Residue on Citric Acid and Glycerol Bioprocesses Using *Aspergillus niger* Under Solid State Fermentation

Asma Ben Salha
Polytechnic Institute of Bragança - CIMO

- Extraction of Lignin from Agro-Food Residues Using Deep Eutectic Solvents

Ana Carolina Cassoni
Catholic University of Portugal - CBQF

- Lemon By-Products: Valorisation Using a Circular Economy Perspective

Daniela Magalhães
Catholic University of Portugal - CBQF

10:40 Break

*pending confirmation

11:00 Pannel 2: Health benefits

João Graça (moderator)
LIPOR

- Health Benefits of a Unique Citrus Species: Antioxidant Properties of Finger Lime (*Citrus australasica*)

Jéssica Santinha Almeida
University of Minho - CITAB

- Bioactive Compounds from By-Products of Craft Beers: Characterization and Potential Applications

Cristiana Breda
University of Trás-os-Montes and Alto Douro - CITAB

- Phenolic Composition and Antioxidant Capacity of Grape Pomace and Grape Stems from the Douro Region

Rui Dias Costa
University of Trás-os-Montes and Alto Douro - CITAB

- Mussel Meat Waste as a Source of Bioactive Ingredients for Industrial Application

Sara Cunha
CBQF - Catholic University of Portugal

- Bioactive Compounds from Winery By-Products: An Innovative Strategy in Wound Management

Irene Gouvinhas
University of Trás-os-Montes and Alto Douro - CITAB

- Orange Juice By-Products as a Sustainable Source of Bioactive Compounds

Ana Vilas-Boas
Catholic University of Portugal - CBQF

12:20 Case study - LIDL

Mariana Diniz — LIDL



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PROGRAM AFTERNOON

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CIRCULAR ECONOMY: MAKE IT HAPPEN

14:30 Introducing SWYP

Ezequiel Coscueta — SWYP

14:40 Case study - Amyris

Brian Edquist — Amyris

15:00 Pannel 3: Food bioeconomy

Diogo Proença (moderator)
University of Coimbra

- How Does Knowledge on the Microbiome can Help Advancing the Valorization of Brewers' Spent Grain Through Volatile Fatty Acids Production

Eunice Costa
Catholic University of Portugal - CBQF

- Valorization of Pistachio Shells: Determination of Mycotoxins

Ana Rita Mateus
University of Coimbra

- Olive By-Products: Approaching the Bioactivity of Leaves for Food Application

Mariana Pedrosa
Polytechnic Institute of Bragança - CIMO

- Antioxidant and Antimicrobial Properties of Aqueous Extracts from *Pleurotus Eryngii* Bio-Residues

Ana Sofia Sousa
Catholic University of Portugal - CBQF

16:00 Break

16:15

Pannel 4: Sustainable resources

Patricia dos Reis (moderator)
Accenture Portugal

- Development of Functional Mortars with Improved Hygroscopic Properties

Guilherme Ascensão
University of Aveiro - RISCO

- Novel Circular Economic Approaches for Efficient Extraction of Valuables from Spent Li-Ion Batteries (Next-Lib): Recovery of Anode Graphite

Charlotte Badenhorst
University of Porto - FCUP

- Molecularly Imprinted Polymers for the Enrichment of Phenolic Compounds from Winemaking Residues

Amir Bzainia
Polytechnic Institute of Bragança - CIMO

- Green Diesel Production by Sustainable Hydroconversion Process Using Shrimp Shell Waste-Based Catalyst

Marta Monteiro
University of Porto - FCUP

- Circular Economy Approach to Construction Materials Incorporating Paper & Pulp Industrial Wastes

Fábio Simões
University of Aveiro - RISCO

- Decontamination of Food-Grade Polypropylene Via Supercritical CO₂ to Close the Loop Towards Circular Economy

Srishti Singh
Catholic University of Portugal - CBQF

17:45

Closing

Ezequiel Coscueta — SWYP



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2nd Online Conference for Young Researchers 2022 Circular Economy: Make It Happen

HOW DOES KNOWLEDGE ON THE MICROBIOME CAN HELP ADVANCING THE VALORIZATION OF BREWERS' SPENT GRAIN THROUGH VOLATILE FATTY ACIDS PRODUCTION

Eliana C. Guarda^{a,b}, Eunice Costa^{c*}, Cláudia F. Galinha^d, Cátia Gil^{a,b}, Catarina L. Amorim^c, Anouk F. Duque^{a,b}, Paula M. L. Castro^c and Maria A.M. Reis^{a,b}

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^b UCIBIO – Applied Molecular Biosciences Unit, Department of Chemistry, NOVA School of Science and Technology, Universidade NOVA de Lisboa, Portugal

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Conference Topics: 6a) Food, Bioeconomy; 6b) Natural resources, Agriculture and Environment

Biotechnological processes using mixed cultures depend on the complex cooperation between microorganisms inhabiting the system. By linking microbiome structure with the operating parameters and performance of biological processes, more efficient processes for converting waste into added value compounds can be obtained.

Brewers' spent grain (BSG) is the most abundant by-product generated by the brewing industry. Due to its availability in large quantities, new possibilities for BSG valorisation are needed, for instance, conversion of this waste into volatile fatty acids (VFAs), through anaerobic fermentation. These added-value compounds have several applications in different industries, such as pharmaceutical, food or textile industries.

In this study, a phylogenetic marker-based microbiome profiling approach, was used to characterize the microbial communities within anaerobic granules. These granules were feed with hydrolysed BSG for VFAs production under different pH values. Depending on the pH applied, bacterial communities varied, which influenced the VFA mixture produced. At pH 4.5, bacterial taxa affiliated with *Olsenella*, *Prevotella*, *Clostridium* and *Caproiciproducens* genera were dominant within the microbiome which resulted in a VFAs mixture rich in acetate and butyrate. However, when pH decreased to 3.9, the microbiome and VFAs mixture profile drastically changed. *Lactobacillus* became the

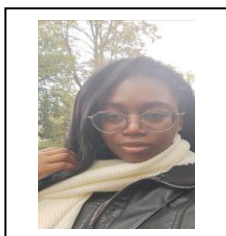


dominant bacterial genera and lactate the highest VFA obtained. Resuming pH to 4.5 led to the restoration of the microbiome and VFA mixture profile.

The downstream application of the VFA mixture produced (e.g., production of biodegradable plastics or biogas) depends on the type of VFAs present. A deeper understanding of the microbiome dynamics improves the ability to manipulate it for a desired VFA mixture production, which could help for advancing bioconversion processes.

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Keywords: Brewer's spent grain; Microbiome; Circular economy; Volatile fatty acids (VFAs)



Short bio: Research fellow at Universidade Católica Portuguesa. Bachelor's in biotechnology and Master's in molecular biology, Biotechnology and Bioentrepreneurship in Plants. Areas of expertise include molecular biology, plant biotechnology and microbiology tools, with special emphasis on the microbiome dynamics when facing different environmental stressors. Waste valorisation and its contribution to circular economy using statistic programming tools.