Proceedings

1st International
Yeast in Bioeconomy Conference
(YBC2025)

October 22-24, 2025 • Compiègne, France

Chairs: Dr. Mohamed Koubaa and Dr. Elia Tomás Pejó

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Book of Abstracts

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Table of Contents

Welcome message

Dear colleagues and participants,

It is our great pleasure, as Chairs of the 1st International Yeast in Bioeconomy Conference, to warmly welcome you to our upcoming event from **October 22nd to 24th, 2025**. We are excited to present an outstanding program dedicated to the latest advances in **strain engineering, fermentation technology, bioprocess scale-up, and techno-economic assessment of bio-based compounds** —all essential for the valorization of industrial wastes and byproducts and the advancement of a global **Bioeconomy**.

Our three-day conference will feature **plenary lectures, oral presentations, and poster sessions**, bringing together leading researchers and industry experts from across the globe: Spain, France, Belgium, Italy, Germany, Turkey, Brazil, the UK, and more. This is a unique opportunity to **share knowledge, foster collaborations, and explore innovative solutions for sustainable bioeconomy applications**.

We are confident that the discussions and exchanges during the programme sessions will **inspire new ideas, collaborations, and strategies for advancing the field**. Please take full advantage of the opportunities to interact with fellow participants, ask questions, and engage in lively discussions.

On behalf of the organizing committee, we wish you an enjoyable and fruitful conference. We look forward to sharing three days of science, innovation, and networking with you.

Best regards,
Mohamed Koubaa & Elia Tomás Pejó
Chairs of the Yeast in Bioeconomy Conference 2025

Scientific Program

October 22-24, 2025 • Compiègne, France

Oral Presentations

October 22nd, 2025

📝 **10:00 AM - 01:30 PM: Registration**

🔔 **01:30 PM - 01:45 PM: Opening Ceremony**

Session 1 – Strain Engineering for Sustainable Bioeconomy Applications

(Session chairs: Verena Siewers 🇸🇪, Patrick Fickers 🇧🇪, Elvira Romero 🇪🇸, Jean-Marc Nicaud 🇫🇷)

🎤 **1:45 PM – 2:30 PM: Plenary Lecture**

- **1:45 PM – Rodrigo Ledesma-Amaro** (Imperial College London, UK): *Engineering biology in yeast cells and communities for a sustainable bioeconomy.*

🎤 **2:30 PM – 3:50 PM: Oral Presentations**

- **2:30 PM – Florence Bordes** (Toulouse Biotechnology Institute, France): *OP1. Easy and efficient tools for multiple gene integrations and deletions in the yeast Y. lipolytica.*

  2:50 PM – Marta López-Rubio (University of Salamanca, Spain): *OP2. Production of vitamin B2 in Ashbya gossypii through precision fermentation.*

  3:10 PM – Ewelina Celińska (Poznan University of Life Sciences, Poland): *OP3. Towards a "sustainable" source of proteins from Yarrowia lipolytica.*

  3:30 PM – Brigifle Gasser (University of Natural Resources and Life Sciences, BOKU, Austria): *OP4. Flo8 – A versatile regulator improving sustainable recombinant protein production in Komagataella phaffii.*

☕ **3:50 PM – 4:15 PM: Coffee break & Poster session**

🎤 **4:15 PM – 6:15 PM: Oral Presentations**

- **4:15 PM – Gennaro Agrimi** (University of Bari Aldo Moro, Italy): *OP5. Biocatalytic depolymerization and upcycling of plastics using engineered Yarrowia lipolytica.*
- **4:35 PM – Inge Van Bogaert** (Ghent University, Belgium): *OP6. Turning non-pathogenic yeasts into powerful long-chain dicarboxylic acid production hosts.*
- **4:55 PM – Putu Virgina Partha Devanthi** (Constructor University, Germany): *OP7. Can the re-introduction of a functional GUT1 allele (GUT1JL1) improve succinic acid production from glycerol in S. cerevisiae?*
- **5:15 PM – Hulya Karaca Atsaros** (Anadolu University, Turkey): *OP8. Metabolic engineering of Saccharomyces cerevisiae for enhanced taxadiene production.*
- **5:35 PM – Markus M. M. Bisschops** (Wageningen University & Research, the Netherlands): *OP9. General stress response & growth-uncoupled production: saving energy and increasing expression.*
- **5:55 PM – Bojan Žunar** (University of Zagreb, Faculty of Food Technology and Biotechnology, Croatia): *OP10. Engineering Debaryomyces hansenii for hypersaline surface display.*

October 23rd, 2025

Session 2 – Fermentation Technology and Bio-Based Compounds Production

(Session chairs: Brigitte Gasser, Marwen Moussa, Anissa Khelfa, José L. Martínez)

🎤 8:00 AM – 8:45 AM: Plenary Lecture

- **8:00 AM – Andreas Gombert** (University of Campinas, Brazil): *Microbial ecology and (meta)genomics for a better understanding and improvement of bioethanol production from sugarcane.*

🎤 8:45 AM – 10:05 AM: Oral Presentations

- **8:45 AM – Volkmar Passoth** (Swedish University of Agricultural Sciences, Sweden): *OP11. Oleaginous Rhodotorula spp. for biochemicals, food and a safe environment.*
- **9:05 AM – Boris Gilis** (University of Antwerp, Belgium): *OP12. Waste valorisation: A biochemical approach to long-chain dicarboxylic acid production.*
- **9:25 AM – Camille Botcazon** (ATV Technologies, France): *OP13. KOSMETOIL project: developing fermented natural oils for the cosmetic field.*
- **9:45 AM – Nabila Imatoukene** (URD ABI, AgroParisTech, France): *OP14. Development of a tailored culture medium for improved de novo biosynthesis of ferulic acid in fed-batch biphasic fermentation with Saccharomyces cerevisiae.*

☕ 10:05 AM – 10:35 AM: Coffee break & Poster session

🎤 10:35 AM – 12:35 PM: Oral Presentations

- **10:35 AM – Octavio García Depraect** (University of Valladolid, Spain): *OP15. Acidogenic fermentation as a platform for the sustainable production of organic acids for yeast applications.*
- **10:55 AM – Iris Cornet** (University of Antwerp, Belgium): *OP16. Rhodosporidium kratochvilovae, a promising yeast for the conversion of lignocellulosic inhibitors into microbial oil.*
- **11:15 AM – *Tomás Zubak*** *(IMDEA Energy Institute, Spain): OP17. Yarrowia lipolytica as a robust cell factory for the valorisation of high-salinity effluents via the carboxylate platform: case of microbial oil production.*
- **11:35 AM – José L. Martínez** (Technical University of Denmark, Denmark): *OP18. Evidencing the capability of Debaryomyces hansenii for the use of VFAs from organic digestates as feedstock for bioproduction.*
- **11:55 AM – Emmanuel Omachoko Anthony** (AgroParisTech, France): *OP19. Valorisation of acetic acid-rich forced endive root juice to produce volatile aroma compounds using Kluyveromyces marxianus.*
- **12:15 PM – Christian Kennes** (University of La Coruña, Spain): *OP20. Sustainable co-production of lipids and carotenoids by Rhodosporidium toruloides using carbon dioxide and acetate as alternative carbon sources.*

🍽 12:35 PM – 2:00 PM: Lunch break

October 23rd, 2025

Session 3 – Pretreatment, Downstream Processing, Bioreactor Design, and Process Scale-Up *(Session chairs: Valeria Mapelli 🇮🇹, David Moreno 🇪🇸, Ewelina Celińska 🇵🇱, Eugène Vorobiev 🇫🇷)*

🎤 **2:00 PM – 2:45 PM: Plenary Lecture**

- **2:00 PM – Elodie Vlaeminck** (Bio Base Europe Pilot Plant, Belgium): *Scaling yeast fermentation and downstream processing: Sustainable production of triacylglycerols with Y. lipolytica.*

🎤 **2:45 PM – 4:05 PM: Oral Presentations**

- **2:45 PM – Nicola Di Fidio** (University of Bari Aldo Moro, Italy): *OP21. Cardoon and wheat straw biorefinery for the production of lactic acid, oil and β-carotene by integrated thermo-physical and biotechnological approaches.*
- **3:05 PM – Sarah Mahfoud** (Université de Technologie de Compiègne, France): *OP22. Yeast for the future of food and feed: downstream processing for alternative protein recovery.*
- **3:25 PM – Margarita Smirnova** (Norwegian University of Life Sciences, Norway): *OP23. Valorization of lignocellulose side-streams containing HMF and furfural into oils for industrial use via oleaginous yeasts.*
- **3:45 PM – Elise Viau** (Toulouse Biotechnology Institute, France): *OP24. Exploring innovative bioprocess routes for ethyl acetate production by K. marxianus using lignocellulosic hydrolysate.*

☕ **4:05 PM – 4:30 PM: Coffee break & Poster session**

🎤 **4:30 PM – 6:30 PM: Oral Presentations**

- **4:30 PM – Alejandro Berzosa** (University of Zaragoza, Spain): *OP25. Cascade extraction of bioactive compounds from yeast biomass using pulsed electric fields.*
- **4:50 PM – Dana Byrtusova** (Norwegian University of Life Sciences, Norway): *OP26. Fed-batch optimization and scale-up of Rhodotorula and Schizochytrium sp. for bio-based epoxy coatings.*
- **5:10 PM – Oleksii Parniakov** (Elea Technology GmbH, Germany): *OP27. Influence of pulsed electric fields with other procedures on extraction from brewer's spent yeast cells.*
- **5:30 PM – Juan Manuel Martínez** (University of Zaragoza, Spain): *OP28. PEF-assisted extraction of carotenoids: Yield enhancement through autolysis and green solvents.*
- **5:50 PM – Mickaël Villeneuve** (Verrerie Dumas, France): *OP29. Automated bioreactor for process optimization: The BLEW® solution.*
- **6:10 PM – Mohamed Koubaa** (TIMR, ESCOM/UTC, France): *OP30. Sustainable scale-up production of odd-chain fatty acids by Y. lipolytica.*

🍽 **8:00 PM – 11:30 PM: Gala dinner (optional): L'Hostellerie du Royallieu (9 Rue de Senlis, 60200 Compiègne, France)**

October 24th, 2025

Session 4 – Techno-Economic Analysis, Life Cycle Assessment, and Industrialization

(Session chairs: Elia Tomás Pejó 🇪🇸, Mohamed Koubaa 🇫🇷)

🎤 8:15 AM – 9:00 AM: Plenary Lecture

- **8:15 AM – Patrick Carré** (Terres Inovia, France): *Techno-economic analysis of microbial oil production: a case study on odd-chain fatty acids.*

🎤 9:00 AM – 10:00 AM: Oral Presentations

- **9:00 AM – Fernanda Thimoteo Azevedo Jorge** (Bio Base Europe Pilot Plant, Belgium): *OP31. Sustainable lactic acid fermentation at low pH using second-generation feedstocks: a techno-economic assessment.*
- **9:20 AM – Marco Vitale** (IMDEA Energy Institute, Spain): *OP32. Toward frameworks for performance evaluation of (yeast-based) sustainable aviation fuel production: gaps and opportunities in science for policy.*
- **9:40 AM – Isabella Pisano** (University of Bari Aldo Moro, Italy): *OP33. Cascading biorefinery of cheese whey permeate: integrated bioethanol and biomethane production through lab-scale validation and techno-economic process modeling.*

☕ 10:00 AM – 10:30 AM: Coffee break & Poster session

🎤 10:30 AM – 11:50 AM: Oral Presentations

- **10:30 AM – Marwen Moussa** (AgroParisTech, France): *OP34. Fermentative production of 2-phenylethanol by yeasts using agro-industrial wastes: a techno-economic and environmental assessment.*
- **10:50 AM – Paola Branduardi** (University of Milano-Bicocca, Italy): *OP35. Production and carbon footprint of microbial oil from waste lemon peel extract.*
- **11:10 AM – Jean-Marc Nicaud** (INRAE, Micalis Institute, France): *OP36. The yeast Yarrowia lipolytica, workhorse chassis for industrial applications.*
- **11:30 AM – Guillaume Le Cloirec** (ATV Technologies, France): *OP37. Scaling-up continuous fermentation: accelerating industrial biomanufacturing with predictive modeling.*

🏆 11:50 AM – 12:15 PM: Closing ceremony and awards

🍽️ 12:15 PM – 1:30 PM: Lunch break

🏭 1:30 PM – 4:00 PM: Visit to ATV Technologies (optional): Parc technologique des rives de l'Oise, Rue les Rives de l'Oise, 60280 Venette, France.

hflps://atv-technologies.com/en/home/

PO8. Enhancing brewing yeasts through combined sexual breeding and adaptive evolution: A case study on β-lyase activity

Chiara Nasuti[1], Viola Ceramelli Papiani[1], Kristoffer Krogerus[2], Davide Tagliazucchi[3], Lisa Solieri[1,4]*

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Keywords: Sexual breeding, adaptive evolution, Non-GMO, β-lyase activity, yeast strain improvement, fermentation, brewing

Abstract

Sexual breeding and adaptive evolution (AE) are non-GMO strategies that leverage natural mechanisms underlying biodiversity to improve industrial yeast strains. Traditionally, these approaches have been applied independently. In this study, we combined them and demonstrated that this integrated strategy is effective in enhancing brewing-relevant traits, particularly those governed by monogenic or polygenic inheritance. As a proof of concept, we applied the approach to improve the capacity of brewing strains to convert cysteine-conjugated hop precursors into volatile thiols, which contribute fruity and tropical aromas highly valued in modern beer styles. In *Saccharomyces cerevisiae*, β-lyase activity is encoded by the polymorphic *IRC7* gene. The short allele (*IRC7*^{S}) encodes a truncated, non-functional protein, whereas the long allele (*IRC7*^{L}) encodes a functional 400-amino acid enzyme. This trait represents a suitable target for the combined breeding and AE approach proposed in this work.

β-lyase activity was assessed using L-cysteine, S-ethyl-L-cysteine, and S-methyl-L-cysteine as substrates in a spectrophotometric assay based on NADH oxidation at 340 nm. Micromanipulator and spore-to-spore method were used to cross a monosporic clone (MSC) of a commercial *S. cerevisiae* strain (ale4) with NBRC1948, a natural *S. eubayanus* × *S. bayanus* hybrid. Hybridization was confirmed by PCR targeting housekeeping genes and enzymatic restriction of the ITS region. Adaptive evolution was carried out in YNB medium under nitrogen-limiting conditions using cysteine as the sole nitrogen source. The experiment lasted 14 weeks: 3 cycles at 5 mM, 5 at 10 mM, and 6 at 15 mM cysteine, each lasting one week. Mutants were selected based on reduced growth inhibition. Growth curves were used to assess performance in cysteine-only (15 mM) medium. Small-scale fermentations were carried out in 10°P hopped wort (5 g/L hops) at 20 °C.

ale4 showed high β-lyase activity on cysteine and its conjugates and was selected as the parental candidate alongside the cryotolerant brewing strain NBRC1948. A MSC of strain ale4 with the functional *IRC7*^{L} allele was crossed with NBRC1948, producing an interspecific hybrid, named CN1. Hybrid formation was confirmed by species-specific PCR and ITS restriction analysis. CN1 overcame parents in β-lyase activity. Initial CN1 strain showed partial growth inhibition in media containing cysteine as a unique nitrogen source, like the parents. AE over 14 weekly cycles with increasing cysteine led to isolate 20 mutants of CN1 which outperform ed parents and the initial hybrid CN1 in cysteine-based nitrogen utilization. Small scale fermentation validated the growth of evolved strains.

Our combined sexual breeding and adaptive evolution strategy led to an interspecific hybrid with enhanced β-lyase activity. Evolution under cysteine stress yielded mutants with improved cysteine assimilation and growth. These non-GMO evolved strains are promising starters for producing aroma-rich beers.

Acknowledgments

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