

Non-Conventional Yeasts for the Production of Bioproducts

Events

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5th WG Meeting at Institute of Physiology, Czech Academy of Sciences in Prague (Czech Republic)

by **Hana Sychrova**

The 5th meeting of the Yeast4Bio working groups took place in Prague in mid-September (21.-22.09.2022). It was hosted by the Institute of Physiology on the campus of biomedical institutes of the Czech Academy of Sciences. This was a hybrid meeting gathering together almost 50 participants from 26 countries. The scientific program was divided into four Sessions. The first two sessions (Production of platform molecules and bioproducts, Non-conventional yeasts capabilities and molecular biology) contained the usual updates of the WG leaders, selected presentations on recent research results, and general discussions on the already obtained achievements and plans for the future. The third session of the program, the main and longest one, was devoted to the presentation of industrial partners and an intense and fruitful panel discussion about the key issues of successful collaboration between Industry and Academia. Dissemination and training plans were thoroughly discussed in the last session of the meeting.

The participants also visited the host laboratories and received basic information on the hosting campus. When the first-day program was over, the participants enjoyed, despite rainy weather, a relaxing walk in a nearby forest crowned by a social dinner. The meeting was enjoyable and productive, and all the participants look forward to the next one.



Career development, individual mobility

“Researchers have been strongly adhering to Short Term Scientific Missions (STSMs) in COST Action YEAST4BIO throughout 2022.”

“As Early Career Investigator, I have gained valuable knowledge and experience of fermentation scaling-up and downstream process from this STSM.”

“After the publication of this work in a high-impact journal, we believe scientific consciousness about the value of this non-conventional yeast will be raised in the wider research community”

Short Term Scientific Missions

STSM-Coordinator: **Susana Marques**

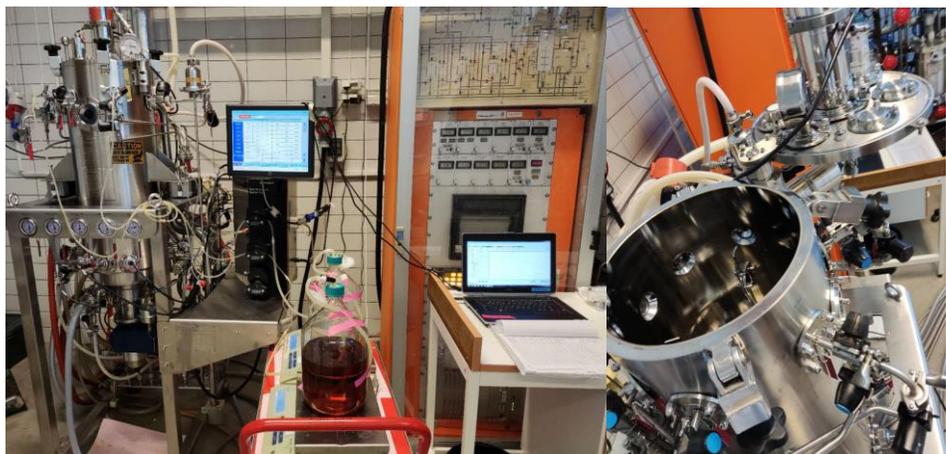
Researchers have been strongly adhering to Short Term Scientific Missions (STSMs) in COST Action YEAST4BIO throughout 2022. After 7 visits have successfully been completed in the first call for STSM in the present 3rd GP (ending by 31st October 2022), 6 additional applications have been submitted and approved in the last call launched in this GP. Three of these visits are still running (to be completed by the end of October) after the termination of the other three additional STSMs, nearly spending the whole budget foreseen for STSMs in this 3rd GP. New STSM call for the 4th Grant Period has been launched and the deadline for applications is 31st of December.

Experiences of completed STSMs

Jing Fu (Chalmers University of Technology, Sweden)

I visited SINTEF industry in Trondheim, Norway in March and April 2022 for 4 weeks to perform the scaling-up experiment of itaconic acid production in their 50L bioreactors. There was an introduction to all of their instruments, including the 50L fermentor and purification equipments, such as industrial centrifuges and cooling crystallizer. An expert, who had run more than 700 bioreactors, worked with me during the whole visit. The 50L bioreactor (NBS® bioflo® 610 fermentation system) started from March 21st. I learned how to operate this system, including autoclave, inoculation, feeding, sampling, finishing up and trouble shooting. The final titer of itaconic acid in the 50L bioreactor is 94.8 g/L, which was the highest itaconic acid titer when using GRAS microorganisms.

As Early Career Investigator, I have gained valuable knowledge and experience of fermentation scaling-up and downstream process from this STSM. The collaboration with SINTEF had expanded the non-conventional yeast research network. After the publication of this work in a high-impact journal, we believe scientific consciousness about the value of this non-conventional yeast will be raised in the wider research community. Moreover, experience gained from *Y. lipolytica* upscaling will also impact the use of this non-conventional yeast for the production of other valuable chemicals beyond this project.



“STSM grant gave me the opportunity to be a visiting scientist abroad as a postdoctoral fellow for the first time.”



Burcu Gündüz Ergün (Ministry of Agriculture and Forestry, Biotechnology Research Center, Turkey)

My name is Burcu Gündüz Ergün and I'm an early career investigator. I'm working as a Food/Chemical Engineer at Republic of Türkiye Ministry of Agriculture and Forestry, Biotechnology Research Center, Ankara. At the same time, I'm a Postdoctoral Research fellow at the Bilket University, National Nanotechnology Research Center (UNAM). I got short term scientific mission (STSM) grant to conduct a research project on “Transcriptional Engineering of Non-conventional Yeast *Pichia pastoris*” at the University of Natural Resources and Life Sciences, Vienna. STSM grant provided me with financial support during my six weeks research stay in Vienna.

STSM grant gave me the opportunity to be a visiting scientist abroad as a postdoctoral fellow for the first time. After earning my PhD degree, I had twin boys in 2019, and after that point I had to allocate my time to too many tasks which impaired my academic works a bit. This STSM grant helped me to conduct international collaborations and gain hands-on research experience with my new life style, which increased my motivation and made me feel very happy and satisfied about my professional life. During my STSM stay, I engineered *P. pastoris* genome with CRISPR/Cas9 editing tools to decipher the roles of certain *P. pastoris* transcription factors on cell metabolism and recombinant protein production. This was a follow-up study of my PhD research and I could get the chance to collaborate with Prof Diethard Mattanovich and Assoc Prof Brigitte Gasser once again after 4 years. My research stay was very fruitful, I obtained very interesting results on the response of *P. pastoris* to the changes of transcriptional regulatory factors. Also, to meet with new researchers around the world and extend my network both professionally and socially was very precious experience. I think the STSM grant is a very valuable support for ECIs who have solid research plans, and I highly recommend it to ECIs to collaborate with other scientists, gain experience and extend the network.

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The Yeast4Bio training school focussing on carotenoids, sterols and fatty acid analysis in non-conventional yeasts. by **Paul Fraser, Rodrigo Ledesma Amaro**

“Collectively fourteen enthusiastic research participants joined the course from a pan-European collection of member states, which made the whole event very enjoyable for all parties.”

On the 7th to the 9th September this year a successful training school focusing on the metabolite profiling of non-conventional yeasts was performed by the Yeast4Bio network. The event was directed towards early career researchers. Royal Holloway University of London hosted the practical aspect of the event. Previously, annual training schools have been carried out, but the present event represented the first return from the pandemic here. The course was over subscribed so we are hoping to run similar events next year. Collectively fourteen enthusiastic research participants joined the course from a pan-European collection of member states, which made the whole event very enjoyable for all parties.

The practical aspects of the school focused on an initial overview of metabolite profiling in order to characterise yeasts metabolic diversity. Then in the first-hand practical sessions' metabolite extractions, chromatographic separations and detection performed and an overview of data analysis methods carried out. The course had a focus on carotenoids, sterols and lipids as high value components of non-conventional yeasts.



“The course had a focus on carotenoids, sterols and lipids as high value components of non-conventional yeasts.”

The 9th September the training school continued at Imperial college in the center of London, an excellent programme was put together by Prof Rodrigo Ledesma-Amaro. Prof Sandmann started the workshop with a talk on metabolic engineering of carotenoids in non-conventional yeasts, followed by Prof Rodrigo Ledesma-Amaro presenting Synthetic biology tools for engineering *Yarrowia lipolytica*, Prof Karen Polizzi presenting Cell-free protein production in *Pichia pastoris* and Dr Pascal Pullmann with *Pichia* resources for Synthetic biology. Finally, all participants gave excellent flash presentations to round of the event. That night we heard of the death of Queen Elizabeth II so being in the center of London on this day was really quite historic in nature.

“It is also very rewarding to see scientists who have participated in European events grow into established researchers and able to teach such advanced high skill sets.”

“The pleasure was mine of meeting leading scientists and professor and it was also a great chance to get know PhD colleagues in topic of yeast all over Europe. What a great time!”



The Yeast4Bio network is grateful to all the speakers, Prof Sandmann particularly who spent a lot of time throughout the course interacting with the researchers and imparting his vast knowledge on the topic. Finally, there has to be a very special thank you to Dr Marilise Nogueira and Dr Harriet Berry who taught, set-up, organised and demonstrated on the course with great aplomb. The whole event would not have been such a success if it was not for their excellent contribution. It is also very rewarding to see scientists who have participated in European events grow into established researchers and able to teach such advanced high skill sets.



Student's experiences of the training school

by **Kata Buda**

On the 7-9th September I took part in training school about *Metabolite profiling of non-conventional yeasts, including lipids (carotenoids) by U/HPLC-PDA and GC-MS* organized by the YEAST4BIO COST Action 18229, hosted by Royal Holloway University of London and Imperial College London.

During the course I had the opportunity to deepen my knowledge about the analysis methods, especially HPLC and expand my theoretical studies about GC-MS. During the training we focused on how to detect carotenoids which was new for me because I have not worked in this field of bioengineering yet. I learnt many lab tricks there I am sure I can apply in my research. It was my very first time flying, moreover alone and very first time I couldn't speak to anyone in my native language, so it was a great challenge for me beyond it was my first PhD training. All in all, I enjoyed it a lot!

The pleasure was mine of meeting leading scientists and professor and it was also a great chance to get know PhD colleagues in topic of yeast all over Europe. What a great time!

Moments in the Action



Future activities, communication

Planned events

6th WG meeting will take place in Smolenice organized after 47th Annual Conference on Yeasts on the 15th-16th of May 2023. It will be organized by Prof Milan Certik.

7th WG meeting and 5th MC meeting will take place in Portugal 17th and 18th October 2023. It will be organized by Susana Marques.

3rd Training School on “*Yarrowia lipolytica* as a cell factory for lipids from short-chain fatty acids considering molecular and engineering techniques” will take place in Wroclaw (Poland) from 5th to 7th of July 2023. It will be organized by Prof Lazar Zbigniew.

New STSM call has been launched and the deadline for applications is 31st of December.

How to find us

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For more information about the Yeast4Bio COST Action, please visit our website and follow our social media profiles.

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Twitter: <https://twitter.com/yeast4bio>

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COST description

COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.
<https://www.cost.eu/>

