

Kick-off session: "Biotechnology
for a sustainable bioeconomy"

Project name: Biovalorization Of Olive Mill Wastewater To
Microbial Lipids And Other Products via *Rhodotorula glutinis*
Fermentation

Project acronym: RHODOLIVE

Name: Alper KARAKAYA



RHODOLIVE
biotechnology for a better future



This project has received funding from the European Union's Horizon
2020 research and innovation programme under grant 722361

Frankfurt am Main, 14.06.2018

- DUZEN (Düzen Biological Sciences Research, Development and Production Co.) (Coordinator) / Türkiye
- NIC (National Institute of Chemistry Department of Catalysis and Chemical Reaction Engineering) / Slovenia
- AIDISA (Association For The Research, Development And Innovation For The Agrifood Industry) / Spain
- ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) / Italy
- Leuphana University of Lüneburg, Institute of Sustainable and Environmental Chemistry / Germany
- UniKassel (University of Kassel Dept. of Biochemistry, group of Biotechnology) Germany
- UNILAT (University of Latvia, Institute of Microbiology and Biotechnology) / Latvia

Total project budget: 1.928.000 €

Project start: 01.06.2018 / 36 months

● Project objectives (problem to be solved)



OMW*
 30M m³
 pH: 3-6
 COD: up to 220 g/L
 Total phenols: 24 g/L



Rhodotorula glutinis



Fermentation

Biomass
 Microbial Lipids
 Antioxidants
 Carotenoids
 Single cell proteins

Fermented OMW
 Lower COD
 Lower total phenol
 Substrate for algae
 and filamentous
 fungi cultivation
 Irrigation
 Fertilization

* Karakaya A, Laleli Y, Takaç S. Development of process conditions for biodegradation of raw olive mill wastewater by *Rhodotorula glutinis*. Int Biodeterior Biodegradation. 2012;75:75-82.

- Scientific approach and project topic area

Synthetic biology, Systems biology, Biotechnological approach(es)

Sustainable production and conversion of different types of feedstocks and bioresources into added value products,

Development of new products, value-added products and supply services

- *WP1: Scaling up R. glutinis strain fermentation*
 - *30L-continuous bioreactor*
 - *Optimisation the conditions for different products*
- *WP2: Separation, isolation and purification of value-added products* -
Green technology; CO₂, green solvents, DES
- *WP3: Development food products with added-value ingredients*
 - *Yeast biomass*
 - *Yeast isolates as additives*
 - *Shelf-life analysis*
 - *Measuring the community acceptancy*
- *WP4: Valorization and reuse of OMW effluent from R. glutinis fermentation*
 - *Screening the best algae and filamentous fungal strains for OMW*
 - *Filamentous fungi and algae cultivations in fermented OMW*
 - *Co-Fermentation*

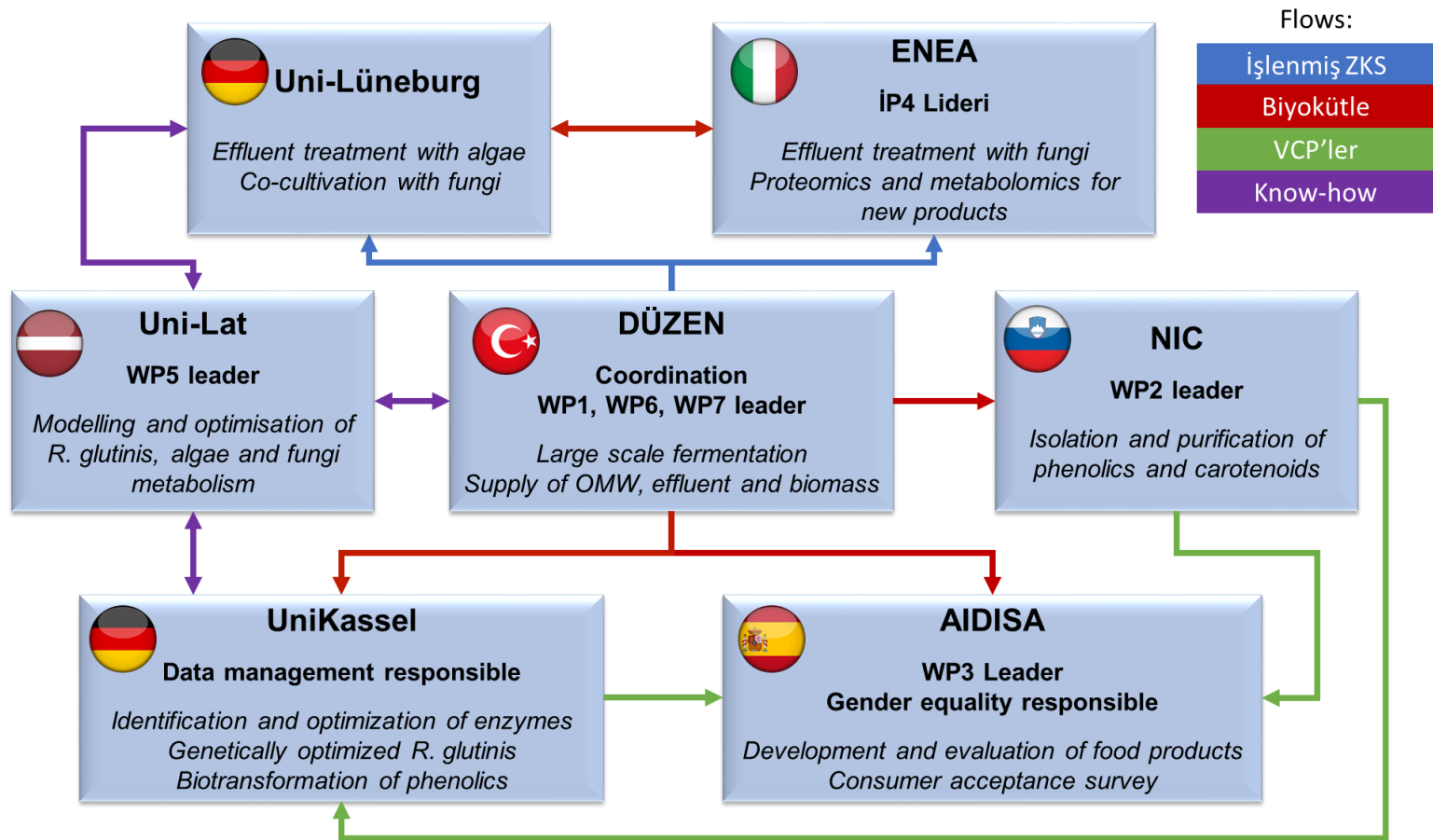
- *WP5: Optimization of metabolic pathways and enzymes of R.glutinis*
 - *Stoichiometric model development and optimization*
 - *Enzyme identification and characterization*
 - *Development of new R. glutinis strain in order to increase the yield*
 - *WP6: Communication and dissemination*
 - *Web site*
 - *Data management (Fairdom)*
- WP7: Project management*
- *Life Cycle Assessment*

- RHODOLIVE agrees with the open distribution of data and the FAIR principles (findable, accessible, interoperable, reusable)
- Our project is already hosted in FAIRDOMHub and our all data will be uploaded
- All data that will be publicly available will be made available under Creative Commons v4.0.
- There will be two levels of usage of the depository. At the first level, FAIRDOMHub will be used to distribute the data between partners. At the second level, and once the partners agree, the data will become available, once the publications are online or there is no interest for IP protection.
- Uni Kassel is responsible for the data management. Prof. F.W. Herberg is the scientific responsible and the University has a Research Data -Consultant (Mr. Arvid Deppe) that will support the projecton the planning and implementing the data management throughout the projection.

- Target: olive oil producers, consumers, academics and policy makers
- Tools: web site, twitter, facebook, Instagram, press, research gate, academia edu, game (apk, IOS)

Project plan

Synergistic aspect of RHODOLIVE



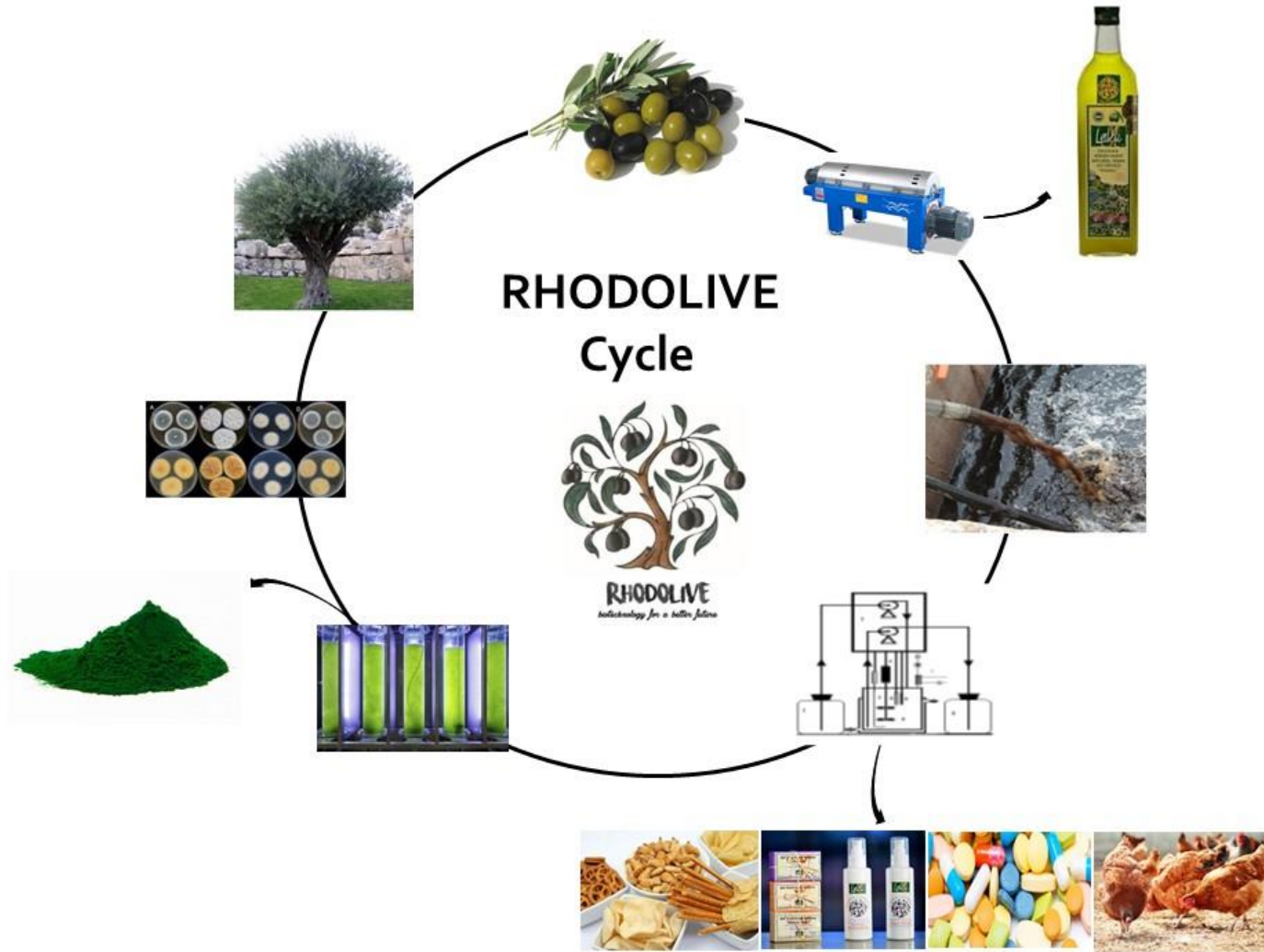
- *Optimisation of *R.glutinis* cultivation conditions in OMW medium in pilot-scale bioreactor.*
- *Development of green extraction process for added valued products from *R.glutinis**
- *Development of food products by using *R.glutinis* biomass and ingredients produced by yeast*
- *Choosing the best algal and fungal strains for cultivation in fermented OMW medium*
- *Identifying enzymes of *R.glutinis* those are playing roles to producing target chemicals in OMW medium.*
- *Manipulating *R.glutinis* in genome scale to increase the productivity in OMW medium*
- *Modelling the biochemical pathways of *R.glutinis* in OMW medium by the kinetic data obtained by cultivation experiments.*
- *Life Cycle Assessment from olives to *R.glutinis* products*

- *What is proposed*

Lowering carbon and water foot print of olive oil production line

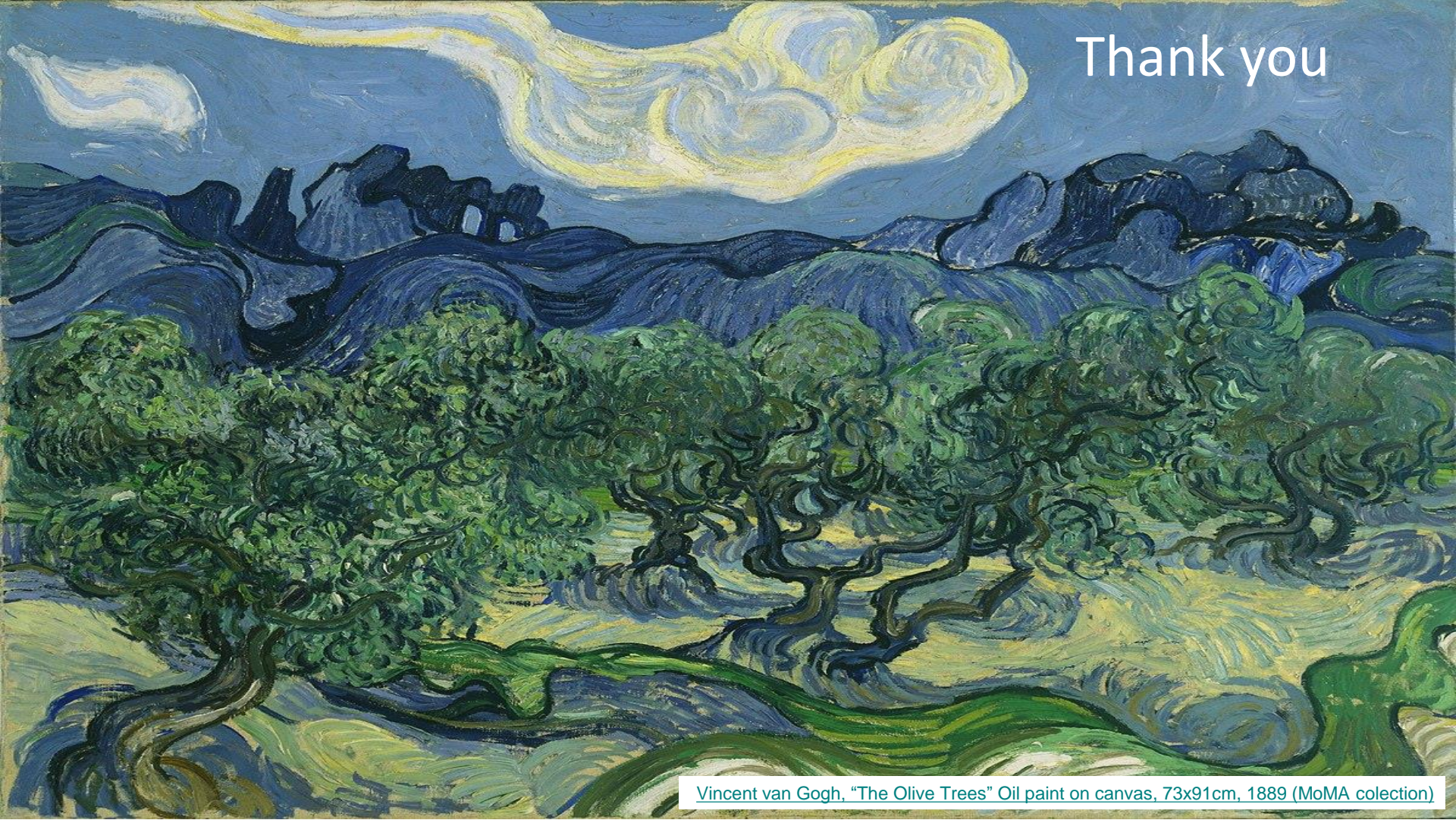
**3015 Liters of water for 1 kg of olives*

Developing a circular economic model for olive oil production



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Thank you



Vincent van Gogh, "The Olive Trees" Oil paint on canvas, 73x91cm, 1889 (MoMA collection)