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Applied Connected Entrepreneurial & Engaged

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SANTARÉM POLYTECHNIC UNIVERSITY

Lietuvos inžinerijos kolegija

LATVIAN ACADEMY OF CULTURE

GOCE DELCEV UNIVERSITY

MEDICAL UNIVERSITY OF GDAŃSK

KÄRNTEN University of Applied Sciences

UFV Universidad Francisco de Vitoria

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Functional wine: when science meets bioeconomy and creates health lifestyle

Participant Universities:

✓ University “Goce Delcev”-Stip, Faculty of Agriculture

Principal Teachers:

✓ Prof. Dr. Sanja Kostadinovic Velickovska-sanja.kostadinovik@ugd.edu.mk

✓ Prof.Dr Emilija Miteva-Kacarski-emilija.miteva@ugd.edu.mk

Stakeholders:

✓ Students and researchers from Faculty of Agriculture, University “Goce Delcev’, Institut of Agriculture, Skopje, Food and veterinary agency Skopje, local wineries and viticulture , AgFutura

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TYPE of Short Learning Opportunity: ABC (Applied Blended Challenge Programs). Enable students and researchers to work collaboratively in the development of new solutions in the area of functional food and wine

Proposed TIME OF YEAR to Deliver the COURSE: one week of training, 2th semester – March 2026

Duration: 90 hours (face to face, synchronous, asynchronous); 3 ECTS

LEARNER TYPE: Students and researchers from **ACE²-EU** universities

Real World Challenge identified by the Stakeholders:

✓ Fully applied program focused on labor market future trends in food, enology and viticulture

✓ Involve students in courses and practical laboratory work in the area of food quality and food control with special emphasis on wine chemistry and wine control

✓ How to use wine chemistry for better understanding health impact of wine consumption and new enological principals for future functional wine.

✓ Participants will work in well equipped laboratory for food and wine quality

✓ Visibility by organization of workshops and scientific meetings,

✓ Joint research in the food science and publishing results in international journals

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Learning outcomes and objectives

✓**Student and research staff-centered**

Module 1: Global wine industry - trends and challenges

- Introduction to the global wine industry
- International wine markets & trade flows
- Wine regulations and compliance

Module 2: Understanding local wine market dynamics

•Visits of local Macedonian wineries

•Identifying challenges: education, specialization, infrastructure, equipment's

Module 3: Multidisciplinary learning at the Faculty of Agriculture with a focus on:

•Wine chemistry, food chemistry

•Enology and enological practices for fictional food and wine

•European union regulation for functional food and functional wine

•Connecti
economi

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Module 4. Innovation, Sustainability and Digitalization

- Functional food impact on human health
- New trends in food science and new formulation for functional food
- Implementation of green technology in enology and viticulture
- Development of green economy by valorization of waste from enology and viticulture
- Economic and environmental benefits of wine waste valorization
- Strategies for achieving the sustainable development goals across the wine chain
- Joint research in the area of food and wine chemistry, publishing of results in international journals with impact factors
- Connections between participants, universities, institutes, stakeholders and local economies (e.g. local wineries)

Pedagogical approach to be taken including Learning and assessment approaches:

- ✓ Face-to-face and online teaching,
- ✓ practical work at the Faculty of Agriculture and UNILAB
- ✓ https://www.youtube.com/watch?v=cswk0s204oU
- ✓ Visit of local vineyards and wineries
- ✓ Developments of new strategies for functional food and wine
- ✓ New insights in food and wine chemistry
- ✓ New insights in food and wine technologies

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Collaborative partners:

Technical University Braunschweig, Institute for Food Chemistry. Technische Universität Braunschweig

The Institute of Physiological Chemistry of the Faculty of Chemistry, Universität Wien ipc.univie.ac.at/en/

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Previous prospects:

1. **Bioeconomy - valorization of waste: isolation of natural pigments, antioxidants and other bioactive compounds from grape pomace**.
Kostadinovic Velickovska, Sanja, Mirhosseini, Hamed and Bogeva, Elena (2013) Isolation of Anthocyanins by high-speed countercurrent chromatography and application of the color activity concept to different varieties of red grape pomace from Macedonia. Journal of Nutrition and Food Science, 3 (6). ISSN 2155-9600 citation 13

2. **Healthy wines – "French paradox"**
Sanja Kostadinović, Andrea Wilkens, Marina Stefova, Violeta Ivanova, Borimir Vojnoski, Hamed Mirhosseini, Peter Winterhalter. Stilbene levels and antioxidant activity of Vranec and Merlot wines from Macedonia: Effect of variety and enological practices, Food Chemistry, 135(4), 2012, 3003-3009, impact factor 8.5. citation 88.

3**. Wine-making and vinification**
Fidanka Ilieva, Sanja Kostadinović Veličkovska, Violeta Dimovska, Hamed Mirhosseini, Hristo Spasov. Selection of 80 newly isolated autochthonous yeast strains from the Tikveš region of Macedonia and their impact on the quality of red wines produced from Vranec and Cabernet Sauvignon grape varieties,
Food Chemistry, 216, 2017, 309-315, impact factor 8.5. citation 29.

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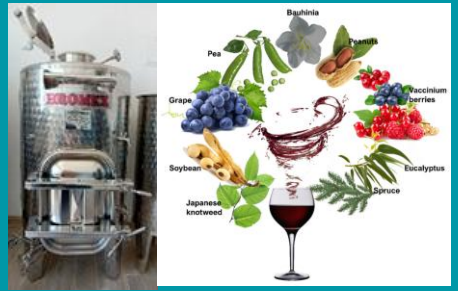
Blackberry wines

Raspberry wines



Kontaxakis, E.; Trantas, E.; Ververidis, F. Resveratrol: A Fair Race Towards Replacing Sulfites in Wines. *Molecules* **2020**, *25*, 2378. https://doi.org/10.3390/molecules25102378

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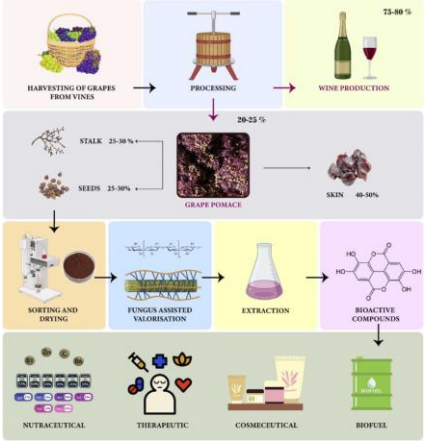
Future prospects:

1. What is functional wine?

Functional wines are grape wines that offer added human health benefits over conventional wines. While functional beverages or nutraceuticals are typically non-alcoholic, functional wines are not necessarily alcohol-removed.

2. Resveratrol-enriched red wine as a possibility?
3. Does functional wine have to be produced only from grapes?
4. Possibility for raspberry and blackberry wines
5. Low alcoholic wine produced with low level of alcohol (less then 5 %)



Gurleen Kaur Sodhi, Gursharan Kaur, Nancy George, Harleen Kaur Walia, Devendra Sillu, Santosh Kumar Rath, Sanjai Saxena, Leonardo Rios-Solis, Vagish Dwibedi,
Waste to wealth: microbial-based valorization of grape pomace for nutraceutical, cosmetic, and therapeutic applications to promote circular economy, Process Safety and Environmental Protection,188, 2024,1464-1478, https://doi.org/10.1016/j.psep.2024.06.059.

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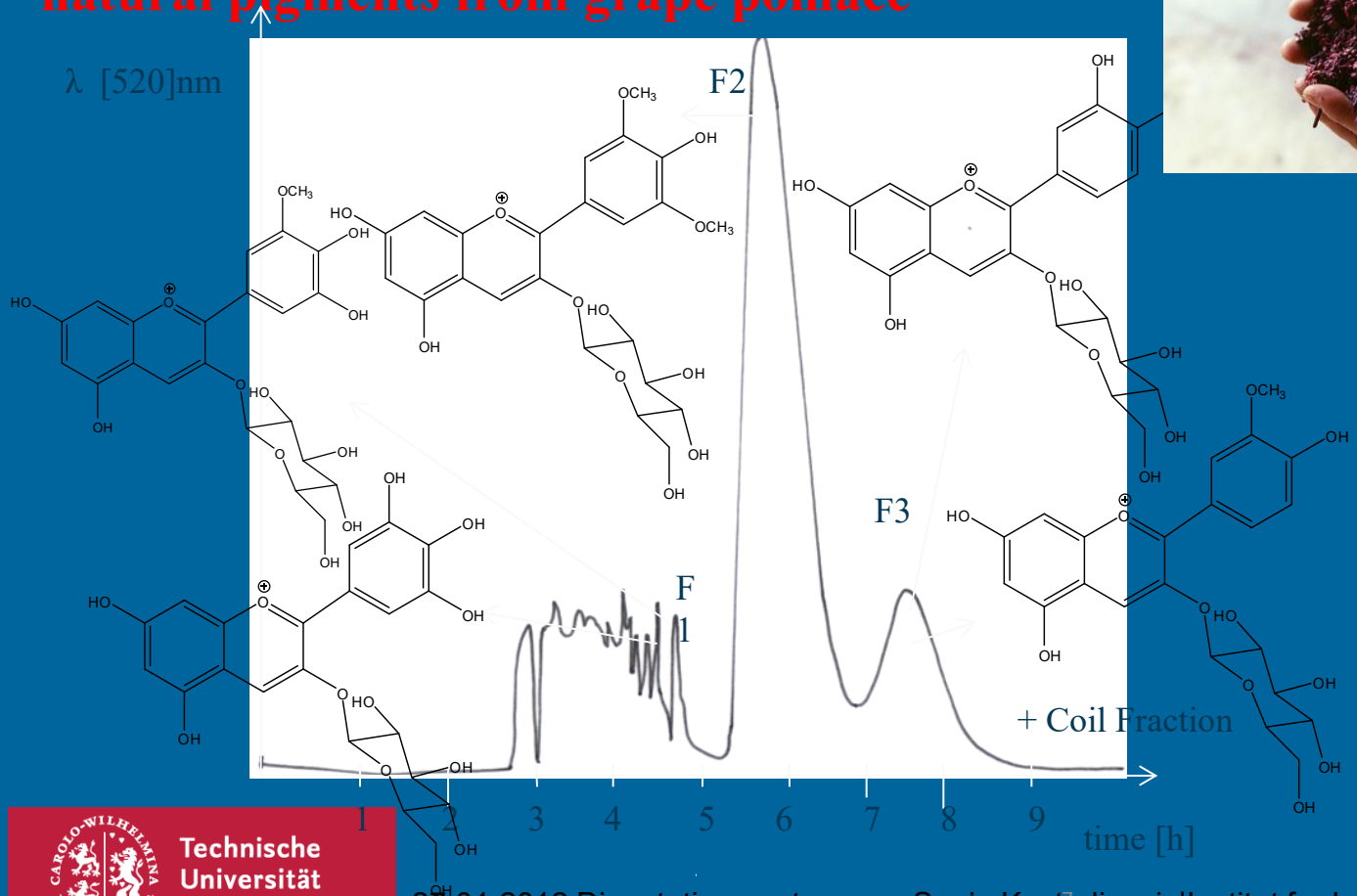
Bioeconomy (from waste to taste) isolation of natural pigments from grape pomace



Technische Universität Braunschweig

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