NEWSLETTER

MAY. 2024 | VOL. 3

Enhancing Research and Innovation Capacity of TUBITAK MRC Food Institute on Dietary Polyphenols and Bioavailability/Bioefficiency

Grant Agreement No: 951994

PhenolAcTwin Bioavailability and Bioefficacy of Polyphenols

What is PhenolAcTwin?

PhenolAcTwin is an EU granted project under H2020-WIDESPREAD-2018-2020 call. The main objective of PhenolAcTwin is to enhance the research and innovation capacity of TUBITAK MRC Food Institute on dietary polyphenols focusing on their bioavailability and bioefficacy via networking with CSIC, QIB, and INRAE. Key scientific aspects of PhenolAcTwin are: molecular identification of dietary polyphenols, bioavailability and biological activity evaluation of dietary polyphenols, in vivo-in vitro analysis, metabolomics and cardiovascular protective effects of dietary polyphenols.

Defined activities of PhenolAcTwin such as; exchange of young researchers, summer schools, expert visits, trainings, conferences, and seminars will help young researchers to enhance the research and innovation capacity, as well as the research profile. PhenolAcTwin will provide mutual benefit to collaborators in the areas of polyphenols, bioavailability and bioefficacy through project activities. This will maximize the impact by enabling the stakeholders (scientist, industry, including SMEs) to be better able to innovate with the availability of new tools, technologies and knowledge. By participating the project activities, food industry will benefit in all aspects of the development and production of innovative healthy food products.

WHAT'S INSIDE THIS ISSUE?

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WELCOME TO THE THIRD RELEASE OF PHENOLACTWIN NEWSLETTER!

PhenolAcTwin

Enhancing Research and Innovation Capacity of TUBITAK MRC Food Institute on Dietary Polyphenols and Bioavailability/Bioefficiency



As PhenolAcTwin Team members we would like to welcome you to the third issue of PhenolAcTwin newsletter. The aim of this publication is to keep you informed of all events, outcomes and updates of PhenolAcTwin. Newsletters of PhenolAcTwin will be published annually in the Project webpage.

We are pleased to share the third PhenolAcTwin newsletter with you, and look forward to sharing more news with you soon. Enjoy! *In this newsletter some pictures were obtained from Freepik.



WEB PAGE

If you like to learn more about PhenolAcTwin project you can visit our web page **https://phenolactwin.eu**/

SOCIAL MEDIA

The PhenolAcTwin communication channels are open, join us!

PhenolAcTwin is also on LinkedIn and Twitter. **FOLLOW US!**



HORIZON 2020



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 951994.



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PROJECT PARTNERS

TUBITAK

Türkiye Bilimsel ve Teknolojik Araştırma Kurumu- Marmara Araştırma Merkezi Gıda Enstitüsü / Türkiye





CEBAS-CSIC

Agencia Estatal Consejo Superior De Investigaciones Científicas / Spain



QUADRAM INSTITUTE

Quadram Institute Bioscience/United Kingdom



INRAE

Institut National De Recherche Pour L'agriculture, L'alimentation Et L'environnement / France

PROJECT PARTNERS | Page 3

COMPLETED

ACTIVITIES

3rd External Joint Research Project Group Meeting

March 14, 2024

External Joint Research Project Group Meeting of the PhenolAcTwin project was held at INRAE Clermont-Ferrand/France on March 14th, 2024. Project partners from TÜBİTAK, CSIC, QIB, and INRAE and external members attended the meeting. At the Meeting, new experts and new areas for collaboration are discussed.



3rd Internal-Twinning Research Project Group Meeting

March 15, 2024

The meeting was held at INRAE Clermont-Ferrand on 15 March 2024. With the participation of project partners, a roadmap for future research and new project proposals were discussed.





COMPLETED

ACTIVITIES EXPERT VISIT-3

3RD EXPERT VISIT WAS HELD ON 6-7 NOVEMBER 2023 IN TÜBİTAK MAM LIFE SCIENCES



Focusing on the scientific topics below;

- 1. Fundamental techniques and protocols for cell culture
- 2. Cytotoxicity assays for evaluation of biological effects of phytochemicals
- 3. Anti-inflammatory mechanism of action of polyphenols
- 4. Basic principles mass spectrometry-based sample analysis
- 5. Polyphenol metabolism in humans

COMPLETED

ACTIVITIES

Summer School in TÜBİTAK

9-10 November, 2023

The Summer School-4 of PhenolAcTwin organized by TÜBİTAK in Kocaeli, Türkiye. Summer School-4 on "Identification of dietary polyphenols in foods and their bioavailability" was held on 9-10 November 2023 in Gebze, Türkiye.





Summer School in QIB

22-24 April, 2024

The Summer School - 1 of PhenolAcTwin organized by QIB in Norwich, UK was held on 22-24 April 2024. The Summer School was focused on "Investigating two-way interactions between dietary polyphenols and the gut microbiome using colon models and LC-MS".



Workshop-3 was held at INRAE Clermont-Ferrand/France on 14-15 March 2024.



The Workshop was focused on "How to address the interest of dietary polyphenols for human health: Last findings on their metabolism and biological activities".

> INRAE www.inrae.fr

TRAINING TÜBİTAK





Dates:

5 January 2024 - Project Management Training- Financial Issues

27-29 February 2024 - Project Management

PROJECT MANAGEMENT

On January 5 and 27-29 February 2024, TÜBİTAK held a training session titled "Project Management Training and Financial Issues." The event aimed to enhance participants' knowledge and skills in managing the financial aspects of research projects. Topics covered included budget planning, cost control, financial reporting, and resource management. Attendees engaged in interactive sessions, gaining practical insights into solving financial challenges in project management. The training was well-received, with participants expressing the value they gained and their anticipation for future sessions.



08.11.2023

TÜBİTAK MAM, KOCAELİ, TÜRKİYE



DR. LAURENT-EMMANUEL MONFOULET, INRAE, FRANCE

Omics approaches to reveal the pleiotropic beneficial effects of dietary polyphenols on health

DR. ANTONIO GONZÁLEZ-SARRÍAS, CEBAS-CSIC, SPAİN

Unravelling the anti-angiogenic effect of dietary phenolics and their circulating metabolites in human aortic endothelial cells



DR. PAUL KROON, QIB, UNİTED KINGDOM

Effects of apple flavan-3-ols supplementation on cardiometabolic health in humans

5TH OF AUGUST, 2023



OPEN-DAY



Open-day was organized in TUBITAK MRC, Kocaeli to introduce capabilities and the Twinning project together with the Seminar. The infrastructure and recent projects of TÜBİTAK was introduced to the participants with a visit to laboratories and the pilot plant.

Project coordinator Dr. Ebru Pelvan Pelitli presented PhenolAcTwin Project and mentioned of PhenolAcTwin activities and the give information about its webpage and social media accounts. Emel Önder Fırat presented Food Institute, its researcher profile, on-going and completed projects, products developed and opportunities for future collaborations.

PhenolAcTwin presentation

TÜGİP and TUBITAK MRC presentation

More than 100 participants attended

INFO-DAYS

Info-days were planned to be organized in three different cities in Türkiye to improve collaboration and networking.



ŞANLIURFA (29.09.2023) Traditional foods, spices;

importance and future aspects

KOCAELİ (05.10.2023) Smart4Env Innovation Week





BURSA (20.11.2023) Olive, olive oil and byproducts

Info-day organized in Şanlıurfa and Bursa were held as co-event of IPA-INNOFOOD project that is coordinated by TÜBİTAK MRC. Info-day organized in Kocaeli was held as co-event of another Twinning project Smart4Env that is coordinated by TÜBİTAK MRC. At each info-day, it is aimed to ensure a diverse mix of participants in terms institutions and fields of interest.

TECHNICAL VISITS

The aim of Technical visits was to visit the well-established centers/institutions and leading SMEs/food processors in Europe and Turkey to collect and share information about latest development, laboratory systems, ongoing projects, and exchange ideas for mutually beneficial collaborative HORIZON 2020/Europe projects. Researchers from TUBITAK aimed to focus on the approach of ongoing projects in hosting institutes, new subjects for writing new projects and exploring possible cooperation, and improve networking.



Italian National Research Council (ISA-CNR) of Avellino

The technical visit was held online with Luigia Di Stasio and Gianfranco Mamone on 07.05.2024.



University of Messina

The technical visit was held online with Giuseppina Mandalari, Maria T. Sciortino, Andreana Marino, Rosamaria Pennisi, Teresa Gervasi and Antonia Nostro on 08.05.2024.



Wageningen University

The technical visit was held online with Edoardo Capuano and Josep Rubert on 13.05.2024.







TECHNICAL VISITS



Ghent University

The technical visit was held online with John van Camp, Elien Alderweireldt, Katleen Raes, Charlotte Grootaert and Julie de Munck on 16.05.2024.



Boğaziçi University -İMBİYOTAB

The technical visit was held atIstanbulMicroalgaeBiotechnologiesResearchandDevelopmentUnitBeratHaznedaroğluon25.04.2024.



EPFL (Ecole Polytechnique Fédérale de Lausanne)

The technical visit was held at Integrative Food and Nutrition Center in Switzerland with Natacha Nargornova on 09.01.2024.



TECHNICAL VISITS



Bühler AG

The technical visit was held in Switzerland with Dr. Ian Roberts, Yasemin Sharityar and Ilgin Ece Aepli on 10.01.2024.



Givaudan Innovation Center

The technical visit was held in Switzerlanfd with Lucas Huber, Sophie Frapolli, Matthias Schultz, Laurence Minisini, Markus Gautschi and Sarah Al-Sayidi on 11.01.2024.





NATIVITAL

The technical visit was held at Nativital Dogal Yasam ve Saglık Urunleri San. Tic. Ltd. Sti. in Türkiye with Sadettin Akça, Tahsin Akça, Ceren Özbağcı, Seda Nur Kabadayı and Neriman Karahan on 11.01.2024.





ADVISORY BOARD



The last Advisory Board Meeting was held in May 28, 2024 with the participation of Advisory Board Members and the PhenolAcTwin Project Management Team. Group focused on defining the potential future line of research to work together. **Ebru Pelvan Pelitli** (TÜBİTAK)

Emel Önder Fırat (TÜBİTAK)

Antonio González Sarrías (CEBAS-CSIC)

> Christine Morand (INRAE)

> > Paul Kroon (QIB)

Jordi Salas-Salvado (Rovira I Virgili University)

> John Van Camp (Ghent University)



ADVISORY BOARD | Page 15

HOT TOPICS

ABSTRACT

Echinacea purpurea L. (EP) preparations are globally popular herbal supplements known for their medicinal benefits. including anti-inflammatory activities, partly related to their phenolic composition. However, regarding their use for the management of inflammation-related intestinal diseases, the knowledge about the fate of orally ingested constituents throughout the human gastrointestinal tract and the exposition of in vitro digested extracts in relevant inflammatory models are unknown. This study investigated for the first time the impact of in vitro gastrointestinal digestion (INFOGEST) on the phenolic composition and antiinflammatory properties of EP extracts from flowers (EF), leaves (EL), and roots (ER) on IL-1B-treated human colon-derived CCD-18Co cells.



Among the seven hydroxycinnamic acids identified using HPLC-UV-MS/MS, chicoric and caftaric acids showed the highest concentrations in EL, followed by EF and ER, and all extracts exerted significant reductions in IL-6, IL-8, and PGE2 levels. After digestion, despite reducing the bioaccessibility of their phenolics, the anti-inflammatory effects were preserved for digested EL and, to a lesser extent, for EF, but not for digested ER. The lower phenolic content in digested EF and ER could explain these findings. Overall, this study emphasizes the potential of EP in alleviating intestinal inflammatory conditions and related disorders.



Article

Polyphenolic Characterization and Anti-Inflammatory Effect of In Vitro Digested Extracts of *Echinacea purpurea* L. Plant Parts in an Inflammatory Model of Human Colon Cells

María Ángeles Ávila-Gálvez ¹, Juan Antonio Giménez-Bastida ¹, Bulent Karadeniz ², Salvador Romero-Reyes ¹, Juan Carlos Espín ¹, Ebru Pelvan ², and Antonio González-Sarrías ^{1,*}

https://doi.org/10.3390/ijms25031744

ORGINAL ARTICLE



International Journal of

Molecular Sciences

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HOT TOPICS

ABSTRACT

Recently, the development of functional beverages has been enhanced to promote health and nutritional well-being. Thus, the fermentation of plant foods with lactic acid bacteria can enhance their antioxidant capacity and others like anti-inflammatory activity, which may depend on the variations in the total content and profile of (poly)phenols. The present study aimed to investigate the impact of fermentation with two strains of Lactiplantibacillus plantarum of several herbal infusions from thyme, rosemary, echinacea, and pomegranate peel on the (poly)phenolic composition and whether lacto-fermentation can contribute to enhance their in vitro antioxidant and anti-inflammatory effects on human colon myofibroblast CCD18-Co cells. HPLC-MS/MS analyses revealed that fermentation increased the content of the phenolics present in all herbal infusions.



In vitro analyses indicated that pomegranate infusion showed higher antioxidant and antiinflammatory effects, followed by thyme, echinacea, and rosemary, based on the total phenolic content. After fermentation, despite increasing the content of phenolics, the antioxidant and anti-inflammatory effects via reduction pro-inflammatory markers (IL-6, IL-8 and PGE2) were similar to those of their corresponding nonfermented infusions, with the exception of a greater reduction in lacto-fermented thyme. Overall, the findings suggest that the consumption of lacto-fermented herbal infusions could be beneficial in alleviating intestinal inflammatory disorders.



Article

antioxidants

Impact of Lactic Acid Bacteria Fermentation on (Poly)Phenolic Profile and In Vitro Antioxidant and Anti-Inflammatory Properties of Herbal Infusions

Tarik Ozturk ^{1,†}, María Ángeles Ávila-Gálvez ^{2,†}, Sylvie Mercier ^{3,†}, Fernando Vallejo ², Alexis Bred ³, Didier Fraisse ³, Christine Morand ³, Ebru Pelvan ¹, Laurent-Emmanuel Monfoulet ^{3,*}, and Antonio González-Sarrías ^{2,*}

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ORGINAL ARTICLE



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