

Integration of PEF in food processing for improving food quality, safety and competitiveness

FieldFOOD newsletter no. 3

June 2017

Welcome to the third FieldFOOD newsletter!

The aim of newsletter is to provide regularly with a brief update of the progress of the FieldFOOD project. We hope that these newsletters serve as a valuable communication and reliable information platform to ensure that end users and beneficiaries of the PEF technology are fully aware and updated with respect to the advances of the project address to application of PEF to the food and drink industries.

FieldFOOD meeting in Vienna

On May 11 and 12, 2017, the FieldFOOD consortium gathered in Vienna at the University of Natural Resources and Life Sciences to discuss the current state of the project and the necessary decisions to realize the targets and ambitions of FieldFOOD. The meeting was attended by members of the scientific committee and delegates of all the consortium parties.

The project meeting was (for some) part of a larger program that week: the 4th School on Pulsed Electric Field Applications in Food and Biotechnology. The aim of this program is to offer students, academics and industrial researchers the opportunity to improve their knowledge of PEF and electroporation technology. You can read more on the PEF School further in this newsletter.

The 2nd annual meeting focused mainly on the results of the various pilots with the PEF technology. The pilots took place in various product categories: tomatoes, olive oil, wine, fruit juices and cider. The consortium partners active in these product categories presented the results of the PEF treatment which showed varying degrees of effectiveness.

In the case of grapes and wine the positive effects of the PEF treatment were evident. PEF treated grapes showed a significantly higher extraction compared to non-treated grapes, in particular for the tannins and anthocyanins which increased strongly. Another important outcome was the reduction of the maceration time while maintaining the same level of extraction.

In the case of olives and olive oil, the results are very divergent – especially in extraction. In some cases, PEF treatment lead to a higher extraction of oil, while in other instances non-treatment resulted in a higher extraction. In this case, more data is needed to understand the effect of PEF and the influence of the raw material on the extraction yield.



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The FieldFOOD project

Until now the lack of industrial-scale equipment and the high costs have limited the commercial use of PEF technology in the food industry. The FieldFOOD project aims to develop flexible low-cost technology and methods. FieldFOOD started in April 2015 and lasts three years. Three universities, a research institute, a federation of food science and technology societies, a manufacturer of pulse power generators and several food processing companies are involved. You can find the results on our website and in our



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Universidad Zaragoza





Another pilot focused on the application of PEF technology to process tomatoes – which resulted in some promising results. The PEF treatment for tomatoes, in this case, is used to improve the separation of the skin from the pulp. On one hand, the PEF treatment makes the tomato pulp below the skin more wet and on the other hand it decreases the firmness and strength of the skin. This leads to a much greater ease of peeling tomatoes.

In the case of cider and fruit juice, there were also mixed results. For the fruit juices (apple and strawberry), the application of PEF technology typically resulted in higher extraction yields, but in the case of the cider production, the extraction seemed to be influenced by several factors, including the temperature and the hardness of the apples. However, the use of PEF for pasteurization was shown to effectively inactivate microorganisms in both fruit juices and cider. Overall, more testing and data will be required to understand the variables in play and the effects.

FieldFOOD at ENOMAQ-OLEOMAQ 2017

From 14 to 17th February the Spanish city of Zaragoza was the decor for a variety of food related trade shows: ENOMAQ-OLEOMAQ, TECNOVID-OLEOTEC and FRUYVER. These three events can be considered as one of the most important international events dedicated to machinery and equipment for the wine and olive oil sector.

This year, more than 1100 professionals participated in these events, with a total number of 27.000 visitors. Given the focus of these events, the FieldFOOD consortium took the opportunity to present the project and its progress to the participants and visitors. The coordinator of the project, Dr. Prof. Javier Raso, opened the ENOMAQ-OLEOMAQ conference – which focusses on machinery and equipment for wine and olive oil production. Dr. Prof. Javier Raso focused in his speech on the potential application of PEF technology in a winery.

During the 4 days of the trade shows, participants and visitors were informed at the FieldFOOD booth about the PEF technology and its potential for their industries. At the booth, people could get a glance of a prototype of the EPS Eplusus-PM1-10 – the device that performs the PEF treatment. Winemakers could also test wines which underwent the PEF treatment. The winemakers loved the more intense color and the aromatic profile of the PEF treated wine.



Work packages

WP1 – Characterization of the raw material
University College Dublin, Ireland
Nigel Brunton
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WP2– Process Design at Pilot Plant Scale
Technische Universität Berlin, Germany
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WP3– PEF Equipment Development
Energy Pulse Systems, Portugal
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WP4– Integration of PEF in the Current Processing Lines
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WP5– Industrial Validation
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WP6– Dissemination, Technology Transfer and Communication
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WP7– Project Management
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The International Society for Electroporation-Based Technologies and Treatments.

The 4th School on Pulsed Electric Field Applications in Food and Biotechnology took place from 9-12th May 2017 at the University of Natural Resources and Life Sciences (BOKU) Vienna, Austria, and brought together 61 people enthusiastic about learning, discussing, and sharing their knowledge on PEF. 32 participants from all over Europe and beyond enjoyed the intensive four-day training program. It consisted of lectures given by 12 leading international PEF experts as well as practical courses conducted by a team of 17 young researchers and students working in the field of emerging food and bioprocessing technologies.

The 4th PEF School was a joint effort between the BOKU Institute of Food Technology and the BOKU Institute for Synthetic Bioarchitectures with strong support from the Technical University Berlin, the University Ljubljana and the Masaryk University Brno as well as from the FieldFood project and EFFoST. The content of the courses was designed for both, academic and industrial researchers and the growing industrial relevance of PEF and other emerging technologies was not only reflected by a considerable number of participants from the industry but also by the support from industrial partners such as Elea, Roplax and EnergyPulse Systems.

A full day pre-event workshop on Numerical Simulation in Food and Bioprocessing gave a valuable insight into new tools for process analysis, design and optimization before the program of the PEF School started and covered all relevant areas from the basics of electroporation up to industrial applications and the legislative framework. Five practical courses on microbial inactivation and preservation by PEF, plant cell disintegration, modelling & simulation, pulse generation & equipment design, as well as emerging food processing technologies were offered each afternoon.

This article was written by Henry Jaeger and Damijan Miklavčič for the newsletter of The International Society for Electroporation-Based Technologies and Treatments and is published here with their consent.

FieldFOOD to participate at the World Congress on Electroporation and Pulsed Electric Fields!

The 2nd World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine and Food & Environmental Technologies is scheduled to take place in Norfolk, Virginia (VA), USA, during the week of September 24th to 28th, 2017.

The FieldFOOD team will organize a workshop on the application of PEF technology. The purpose of this session is present the main results obtained during the first two years of the project including tests conducted in the processing plants of the food companies involved in the project. At the end of the session a tasting of the wines elaborated in the winery with grapes treated by PEF will be conducted.

Scientific Advisory Board



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Head of Research, Development and Innovation at FIAB and Secretary General at Spanish Technology Platform Food for Life



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Brian McKenna
Emeritus Professor of Food Science at University College Dublin and Fellow International Academy of Food Science and Technology (IAFoST)



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Program of the FieldFOOD session at the World Congress on Electroporation and Pulsed Electric Fields:

- "Introduction to FieldFOOD". Javier Raso. University of Zaragoza (Spain)
- "PEF assisted extraction of fruit juices". Nigel Brunton. University college of Dublin (Ireland)
- "PEF assisted fruit juice preservation in FieldFOOD - Insights into industrial scale processing and optimization" Matthias Schulz. Technical University of Berlin (Germany)
- "On the integration of Pulsed Electric Fields technology in the tomato fruits processing" Giampiero Pataro. ProdAL. University of Salerno (Italy)
- "PEF industrial equipment - modulators and transducers" Luis Redondo. Energy Pulse System. Lisbon (Portugal)
- "Environmental impact assessment of the PEF technology incorporation in food processing" Jorge Arnal CIRCE (Spain)
- Tasting of wine obtained from grapes treated by PEF Guillermo Saldaña Unizar (Spain)



FieldFOOD goes to Mexico!

Javier Raso, coordinator of the FieldFOOD project was invited to speak at the 21st edition of the International Symposium on Food Engineering: Nuovo. The objective of the symposium was to create and encourage interaction between food companies, food professionals and food students. It provided a platform to share insights and experiences about the food industry.

During the symposium, Javier Raso presented the FieldFOOD project to the audience and explained the fundamentals of PEF technology and the potential application for the food industry. Javier Raso was also invited by Prof. Julio Montanez of the Universidad Autónoma de Coahuila to give two seminars on the latest developments regarding the use of PEF technology in the food industry.

Congratulations!

We would like to use this instance to congratulate our partner Bodegas Aragonesas S.A. for receiving the second edition of the ENOMAQ Excellence Award during the ENOMAQ 2017 trade show. Bodegas Aragonesas S.A. received this award for their efforts to improve grape quality, the study and cultivation of minority grape varieties, their innovative winemaking process such as the application of high voltage electric pulses and for their engagement in local and European projects!



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ARAGONESAS
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CENTRO DE INVESTIGACIÓN DE RECURSOS Y CONSUMOS ENERGÉTICOS