

UNIVERSITÀ DEGLI STUDI DI MILANO

selezione pubblica per n._1_ posto/i di Ricercatore a tempo determinato ai sensi dell'art.24, comma 3, lettera a) della Legge 240/2010, per lo svolgimento di attività di ricerca vincolata su tematiche green e innovazione - DM 10 agosto 2021 n. 1062, per il settore concorsuale 07/F1 - Scienze e Tecnologie Alimentari settore scientifico-disciplinare AGR/15 - Scienze e Tecnologie Alimentari presso il Dipartimento di Scienze per gli Alimenti, la Nutrizione e l'Ambiente (DeFENS), (bando pubblicato sul sito Web d'Ateneo in data 04/10/2021) Codice concorso 4895.

DANIELE CARULLO – CURRICULUM VITAE

Date and place of birth: 10/01/1991, Avellino (Italy)

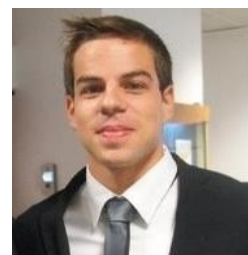
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MAIN RESEARCH FIELDS:

- Application of pulsed electric fields (PEF) and ohmic heating (OH) technologies as cell disintegration pre-treatment stages of plant materials and microalgae to improve the extraction of valuable compounds;
- Integration of PEF technology at the industrial scale for sustainable and energy-efficient processing of food products;
- Use of high hydrostatic pressure (HHP) and high-intensity pulsed light (HILP) systems for inducing structure modification of allergens in food products;
- Mathematical modeling in Food/Chemical processes.

EDUCATION:

01/11/2015 – 06/03/2019

Doctor of Philosophy in Industrial Engineering (Excellent)

University of Salerno (Fisciano, Italy) – Department of Industrial Engineering – Curriculum: Chemical Engineering

Thesis under the supervision of Prof. Eng. Giovanna Ferrari and Prof. Eng. Gianpiero Pataro: *Integration of pulsed electric fields technology in the biorefinery of agri-food wastes and microalgae*

01/11/2012 – 02/03/2015

Master Degree in Food Engineering (110/110 cum laude)

University of Salerno (Fisciano, Italy)

Thesis under the supervision of Prof. Eng. Giovanna Ferrari and Prof. Eng. Gianpiero Pataro: *Pulsed Electric Fields-assisted extraction of juice and bioactive compounds from fruits and their by-products*

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| 10/09/2014 – 21/12/2014 | LLP Erasmus Program Université de Technologie de Compiègne, Compiègne (France) During my stay in Compiègne, I worked at the "Laboratoire Transformation Intégrées de la Matière Renouvelable- Centre de Recherche Royallieu" and I carried out laboratory training and research work for my Master Thesis. The aim of my study was to evaluate the effect of PEF (Pulsed Electric Fields) and the maturity degree of different cider apple varieties on the yield and quality of expressed juice (polyphenols content and antioxidant power) obtained by pressing apple mashes. |
| 01/10/2009 – 30/10/2012 | Bachelor Degree in Chemical Engineering (110/110 cum laude) University of Salerno (Fisciano, Italy) Thesis under the supervision of Prof. Eng. Giovanna Ferrari and Prof. Eng. Gianpiero Pataro: <i>Effect of Pulsed Light treatments on qualitative aspects of food products.</i> |
| 01/09/2004 – 10/07/2009 | Certificate in Science and Technology (93/100) L.S. "V. De Caprariis", Atripalda (Italy) |

WORKING EXPERIENCE

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| 14/09/2020 - Present | Postdoctoral position Department of Sustainable Food Processes – Università Cattolica del Sacro Cuore, Piacenza (PC) - Italy Collaboration in research activities on the development of new competitive and sustainable bio-based plastics in the frame of the European project “NEWPACK” (https://www.newpack-h2020.eu). <i>Main activities:</i> <ul style="list-style-type: none"> - Modeling and simulation of polyhydroxybutyrate (PHB) production through fermentation processes; - Characterization of raw materials (gas permeability & migration tests). |
| 01/07/2019 – 30/06/2020 | Postdoctoral position Department of Industrial Engineering – University of Salerno, Fisciano (SA) - Italy Development of innovative processes based on HHP and HILP technologies for reducing the allergenic power of foods. <i>Main activities:</i> <ul style="list-style-type: none"> - Management, set-up, and maintenance of lab-scale HHP and HILP equipments; - Collaboration to prepare project proposals; |

- Timing set-up (Gantt chart) of research activities;
- Set-up of protocols for analytical methods;
- Raw materials characterization (chemical-physical & techno-functional properties);
- Execution of UV-Vis and IR spectroscopy, native and SDS-PAGE analyses;
- Preparation of scientific reports for third parties production;
- Preparation, review, and editing of scientific papers for publication.

01/05/2016 – 10/12/2016

Research fellow

Prodal S.c.a.r.l., Fisciano (SA) - Italy

Collaboration in research activities on the application of PEF to in consumption in the frame of the European project “Integration of pu improving food quality, safety and competitiveness” – FieldFOOD ([h](#)

Main activities:

- Design, management, set-up, and maintenance of pilot-scale PEF equipments;
- Timing set-up (Gantt chart) of research activities;
- Research assistant for pilot- and industrial-scale PEF-assisted peeling tests of tomatoes;
- Set-up of protocols for analytical methods;
- Raw materials characterization (chemical-physical properties);
- Preparation, review, and editing of scientific papers for publication.

01/05/2015 – 31/10/2015

Research fellow

Prodal S.c.a.r.l., Fisciano (SA) – Italy

Collaboration in research activities on the application of PEF to improve the peelability of tomatoes reducing energy consumption in the frame of the European project “Integration of pulsed electric field technology in food processing for improving food quality, safety and competitiveness” – FieldFOOD.

Main activities:

- Management, set-up, and maintenance of lab-scale PEF equipments;
- Timing set-up (Gantt chart) of research activities;
- Research assistant for lab-scale PEF-assisted peeling tests of tomatoes;
- Set-up of protocols for analytical methods;
- Raw materials characterization (chemical-physical properties);
- Preparation, review, and editing of scientific papers for publication.

AWARDS

- Best outstanding presentation – 1ST place – “Food and Technology Student” category - Proceedings of the “2nd World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies” (Norfolk, 24 – 28 September, 2017);
- Best Ph. D. Thesis - 2ND place - AIDIC (Italian Association of Chemical Engineering) Award, 2019.

REVIEWER ACTIVITY

- Chemical Engineering Transactions (2019);
- Innovative Food Science & Emerging Technologies (2020);
- Food Research International (2020);
- MDPI – Foods (2021).

ASSISTANCE TO MASTER AND UNDERGRADUATE STUDENTS IN CHEMICAL/FOOD ENGINEERING (University of Salerno, 2015 – 2020)

I assisted master students of Food Engineering and undergraduate students of Chemical Engineering of the University of Salerno during the preparation of their thesis on the following topics:

- Use of Electro-technologies (PEF, Ohmic Heating, HVED) in food processing and biotechnology;
- Use of High-Pressure Homogenization (HPH) for Extraction of Valuable Compounds from agro-food wastes and microalgae;
- Protein structural modifications by High Hydrostatic Pressure (HHP), High-Pressure Homogenization (HPH), and High-Intensity Pulsed Light (HILP).

as well as during the practical work of the Courses of Process Unit Operations (Food Engineering, Master Degree), Chemical Plant I (Chemical Engineering, Undergraduate program), and Unit Operations in the Food Industry (Chemical Engineering, Undergraduate program).

Teaching assistance:

| Course | Course of study | Period | Type of activity | Total hours |
|--------------------------------------|--|-----------------------|----------------------------------|-------------|
| Process Unit Operations | Food Engineering (Master Degree) | 11 – 13 November 2015 | Practical work in laboratory | 6 |
| Process Unit Operations | Food Engineering (Master Degree) | 18 November 2015 | Practicals | 3 |
| Unit Operations in the Food Industry | Chemical Engineering (Bachelor Degree) | 30 May, 2016 | Practicals, preparation for exam | 3 |

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| Chemical Plant I | Chemical Engineering (Bachelor Degree) | 4 December 2017 | Exam assistance | 4 |
| Seminar on “Nutraceutics” | Secondary school (Chemical course) | 4 May 2018 | Frontal lecture | 4 |
| Unit Operations in the Food Industry | Chemical Engineering (Bachelor Degree) | 30 May 2018 | Practical work in laboratory | 3 |
| Chemical Plant I | Chemical Engineering (Bachelor Degree) | 23 July 2018 | Exam assistance | 4 |
| Mathematical modeling of processes in food industry | Food Engineering (Master Degree) | 11 September 2018 | Exam assistance | 2 |
| Chemical Plant I | Chemical Engineering (Bachelor Degree) | 13 September 2018 | Exam assistance | 4 |
| Chemical Plant I | Chemical Engineering (Bachelor Degree) | October 2019 – March 2020 | Laboratory teaching, practicals, preparation for exam, exams assistance | 34 |

ASSISTANCE TO MASTER & UNDERGRADUATE STUDENTS IN FOOD SCIENCE & TECHNOLOGY (Università Cattolica del Sacro Cuore, 2020 – 2021)

I assisted master and undergraduate students of Food Science & Technology of the “Università Cattolica del Sacro Cuore” during the preparation of their thesis on the following topics:

- Additivation of chitin into bioplastics to improve their mechanical/barrier properties;
- Mathematical modeling of Spray-drying processes for the production of antioxidant powders via food wastes valorization.

as well as during the practical work of the Courses of Food Technology (Food Production Management, Undergraduate program), Mitigation Of Risk In Food Production (Food Science & Technology, Master Degree), Food Technology & Plants (Food Processing: Tradition & Innovation, Master Degree), and Food Processing (Food Processing: Tradition & Innovation, Master Degree).

Teaching assistance:

| Course | Course of study | Period | Type of activity | Total hours |
|---------------------------------------|---|-----------------|------------------|-------------|
| Mitigation Of Risk In Food Production | Food Science & Technology (Master Degree) | 27 October 2020 | Seminar | 2 |

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|--------------------------|---|--------------------------------|------------------|----|
| Food Technology | Food Production Management (Bachelor Degree) | 26 February – 16 April 2021 | Frontal lectures | 12 |
| Food Technology | Food Production Management (Bachelor Degree) | 20 – 21 April 2021 | Exam assistance | 6 |
| Food Technology | Food Production Management (Bachelor Degree) | 28 – 29 June 2021 | Exam assistance | 6 |
| Food Technology | Food Production Management (Bachelor Degree) | 12 – 13 July 2021 | Exam assistance | 6 |
| Food Technology | Food Production Management (Bachelor Degree) | 6 – 7 September 2021 | Exam assistance | 6 |
| Food Technology & Plants | Food Processing: Tradition & Innovation (Master Degree) | 2 March – 27 April 2021 | Frontal lectures | 24 |
| Food Technology & Plants | Food Processing: Tradition & Innovation (Master Degree) | 7 May 2021 | Seminar | 2 |
| Food Technology & Plants | Food Processing: Tradition & Innovation (Master Degree) | 21 - 23 June 2021 | Exam assistance | 8 |
| Food Technology & Plants | Food Processing: Tradition & Innovation (Master Degree) | 5 – 6 July 2021 | Exam assistance | 6 |
| Food Technology & Plants | Food Processing: Tradition & Innovation (Master Degree) | 7 – 8 September 2021 | Exam assistance | 8 |
| Food Processing | Food Processing: Tradition & Innovation (Master Degree) | 21 September – 12 October 2021 | Frontal lectures | 17 |

LANGUAGES

- Italian - Native Language;
- English - Fluent (Certification in Advanced English, CAE, May 2017);
- Spanish – Intermediate.

JOB-RELATED SKILLS

- I am able to operate different laboratory and pilot plant equipment for microbial inactivation (Pulsed Electric Fields, Pulsed Light), for structural modification of food proteins (High Hydrostatic Pressure, High-Pressure Homogenization), and for enhancing the extraction of intracellular compounds from food and food by-products (Pulsed Electric Fields, Ohmic Heating). I am also capable of managing several lab facilities for performing routinary analyses (pH-meter, refractometer, rotavapor, spectrophotometers, Ultra-Turrax, Particle size analyzers, SDS-PAGE systems, tensiometers).

DIGITAL SKILLS

- Microsoft Office (Word, Excel, and PowerPoint) – Proficient User.
- Engineering Softwares (Matlab, SigmaPlot, IBM SPSS Statistics, SimCentral Simulation Platform, ProII Simulation Platform) – Advanced User.

PUBLICATIONS

| Papers on ISI Journals | |
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| 1 | Pataro G., Carullo D., Bobinaite R., Ferrari G. (2017). Improving the extraction yield of juice and bioactive compounds from sweet cherries and their by-products by pulsed electric fields. <i>Chemical Engineering Transactions</i> , 57: 1717 – 1722 (DOI: 10.3303/CET1757287) |
| 2 | Carullo D., Abera B. D., Casazza A. A., Donsi F., Perego P., Ferrari G., Pataro G. (2018). Effect of Pulsed Electric Fields and High-Pressure Homogenization on the aqueous extraction of intracellular compounds from the microalgae <i>Chlorella vulgaris</i> . <i>Algal Research</i> , 31: 60 – 69 (DOI: 10.1016/j.algal.2018.01.017) |
| 3 | Pataro G., Carullo D., Siddique A., Falcone M., Donsi F., Ferrari G. (2018). Improved extractability of carotenoids from tomato peels as side benefits of PEF treatment of tomato fruit for more energy-efficient steam-assisted peeling. <i>Journal of Food Engineering</i> , 233: 65 – 73 (DOI: 10.1016/j.jfoodeng.2018.03.029) |
| 4 | Pataro G., Carullo D., Ferrari G. (2019). Effect of PEF Pre-treatment and Extraction Temperature on the Recovery of Carotenoids from Tomato Wastes. <i>Chemical Engineering Transactions</i> , 75: 139-144 (DOI: 10.3303/CET1975024) |
| 5 | Pataro G., Carullo D., Ferrari G., (2019). PEF-assisted Supercritical CO ₂ Extraction of Pigments from Microalgae <i>Nannochloropsis Oceanica</i> in a Continuous Flow System. <i>Chemical Engineering Transactions</i> , 74: 97-102 (DOI: 10.3303/CET1974017) |
| 6 | Frontuto D., Carullo D., Harrison S.M., Brunton N.P., Ferrari G., Lyng J.G., Pataro G. (2019). Optimization of Pulsed Electric Fields-Assisted Extraction of Polyphenols from Potato Peels Using Response Surface Methodology. <i>Food and Bioprocess Technology</i> , 12: 1708 - 1720 (DOI: 10.1007/s11947-019-02320-z) |
| 7 | Pataro G., Carullo D., Falcone, M., Ferrari G., (2020). Recovery of lycopene from industrially derived tomato processing by-products by pulsed electric fields-assisted extraction. <i>Innovative Food Science & Emerging Technologies</i> , 63: 102369 (DOI: 10.1016/j.ifset.2020.102369) |

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| 8 | Carullo D., Donsi F., Ferrari G. (2020). Influence of high-pressure homogenization on structural properties and enzymatic hydrolysis of milk proteins. <i>LWT – Food Science & Technology</i> , 130: 109657 (DOI: 10.1016/j.lwt.2020.109657). |
| 9 | Carullo D., Pataro G., Donsi F., Ferrari G. (2020). Pulsed electric fields-assisted extraction of valuable compounds from <i>Arthrospira Platensis</i> : Effect of pulse polarity and mild heating. <i>Frontiers in Bioengineering & Biotechnology</i> , 8: 551272 (DOI: 10.3389/fbioe.2020.551272). |
| 10 | Nutrizio, M., Pataro, G., Carullo, D., Carpentieri, S., Mazza, L., Ferrari, G., et al. (2020). Green extraction of bioactive compounds and aromas from wild thyme (<i>Thymus serpyllum</i> L.) - theoretical prediction using Hansen solubility parameters and COSMO-RS software and experimental procedure by means of high voltage electrical discharges. <i>Molecules</i> , 25: 4131 (DOI: 10.3390/molecules25184131). |
| 11 | Carullo, D., Barbosa-Canovas, G.V., Ferrari, G. (2020). Changes of structural and techno-functional properties of high hydrostatic pressure (HHP) treated whey protein isolate over refrigerated storage. <i>LWT – Food Science & Technology</i> , 137: 110436 (DOI: 10.1016/j.lwt.2020.110436). |
| 12 | Carullo D., Donsi F., Ferrari G., Pataro G. (2021). Extraction improvement of water-soluble compounds from <i>Arthrospira platensis</i> through the combination of high-shear homogenization and pulsed electric fields. <i>Algal Research</i> , 57: 102341 (DOI: 10.1016/j.algal.2021.102341) |
| 13 | Bassani A., Fiorentini C., Duserm Garrido G., Carullo D., Spigno G. (2021). Kinetic Model of Wheat Straw Autohydrolysis Considering Heating and Cooling Phases. <i>Chemical Engineering Transactions</i> , 87: 199 – 204 (DOI: 10.3303/CET2187034) |
| 14 | Junqua R., Carullo D., Ferrari G., Pataro G., Ghidossi R. (2021). Ohmic heating for polyphenol extraction from grape berries: an innovative prefermentary process. <i>OENO One</i> , 2: 39 – 51 (DOI: 10.20870/oeno-one.2021.55.3.4647) |

Conference Proceedings with Peer Review

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| 1 | Carullo D., Turk M., Pataro G., Ferrari G., Vorobiev E. (2015). PEF treatments of different varieties and maturity degrees of apples: effect on juice and polyphenols extraction. ORAL PRESENTATION School on applications of Pulsed Electric Fields for food processing (PEF SCHOOL), Fisciano, Italy, 7 – 12 February 2015. |
| 2 | Pataro G., Carullo D., Ferrari G. (2015). The use of PEF technology for improving mass transfer phenomena in traditional unit operations of food industry. POSTER PRESENTATION XXIII International Symposium on Bioelectrochemistry and Bioenergetics of the Bioelectrochemical Society, Malmo, Sweden, 14 – 18 June 2015. |
| 3 | Delsart C., Carullo D., Sternad Lemut M., Pataro G., Ferrari G., Trost K. (2015). Towards a green and sustainable recovery of phenolic compounds from food by-products. POSTER PRESENTATION 1 st World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies, Portoroz, Slovenia, 6 – 10 September 2015. |
| 4 | Nedelkoska D. N., Pataro G., Carullo D., Capitoli M. M., Ferrari G. (2015). Pulsed electric fields assisted extraction of carotenoids from tomato by-products. POSTER PRESENTATION 1 st World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies, Portoroz, Slovenia, 6 – 10 September 2015. |

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| 5 | Carullo D., Pataro G., Bobinaite R., Ferrari G. (2015). Improving the extraction yield of juice and valuable compounds from sweet cherry and their by-products by Pulsed Electric Fields. POSTER PRESENTATION 1 st World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies, Portoroz, Slovenia, 6 – 10 September 2015. |
| 6 | Pataro G., Carullo D., Donsì G., Ferrari G. (2016). PEF-assisted green solvent extraction of high-added value compounds from agri-food by-products. ORAL PRESENTATION 2 nd Green Extraction of Natural Products Conference, Turin, Italy, 31 May- 1 June 2016 |
| 7 | Pataro G., Carullo D., Maresca P., Ferrari G. (2016). Application of Pulsed Electric Fields technology for improving peeling of tomato fruits. ORAL PRESENTATION 18 th World Congress on Food Science & Technology – IUFOST, Dublin, Ireland, 21-25 August 2016 |
| 8 | Carullo D., Pataro G., Apicella E., Ferrari G. (2016). Extraction of valuable compounds from microalgae by pulsed electric field and high-pressure CO ₂ . POSTER PRESENTATION 30 th EFFoST International Conference, Wien, Austria, 28-30 November 2016. |
| 9 | Pataro G., Carullo D., Capitoli M.M., Ferrari G. (2016) Application of Pulsed Electric Fields technology in tomato fruit processing. ORAL PRESENTATION 30 th EFFoST Conference, Wien, Austria, 28-30 November 2016. |
| 10 | Pataro G., Carullo D., Abera B. D., Donsì F., Ferrari G., (2017). Pulsed Electric Fields and High-Pressure Homogenization assisted extraction of valuable compounds from microalgae <i>C. vulgaris</i> . ORAL PRESENTATION FITEMI - Italian Forum on Microalgal Technologies -, Palermo, Italy, 6-7 April 2017. |
| 11 | Carullo D., Pataro G., Ferrari G. (2017). PEF assisted green solvent extraction of high-added value compounds from agri-food by-products. ORAL PRESENTATION 2 nd World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies, Norfolk, Virginia, USA, 24-28 September 2017. |
| 12 | Carullo D., Pataro G., Abera B.D., Scognamiglio M., Donsì F., Ferrari G. (2018). Application of Pulsed Electric Field and High-Pressure Homogenisation in the Biorefinery of Microalgae. ORAL PRESENTATION IFT-EFFoST 2018 International Nonthermal Processing Workshop and Short course, Sorrento/Salerno, 25-27 September 2018. |
| 13 | Carullo D., Pataro G., Ferrari G. (2018). Influence of comminution degree on the PEF-assisted extraction of phenolic compounds from artichoke bracts. POSTER PRESENTATION IFT-EFFoST 2018 International Nonthermal Processing Workshop and Short course, Sorrento/Salerno, 25-27 September 2018. |
| 14 | Pataro G., Carullo D., Falcone M., Ferrari G. (2018). Recovery of lycopene from industrial tomato processing wastes by pulsed electric fields. POSTER PRESENTATION IFT-EFFoST 2018 International Nonthermal Processing Workshop and Short course, Sorrento/Salerno, 25-27 September 2018. |
| 15 | Frontuto D., Carullo D., Brunton N., Pataro G., Ferrari G., Lyng J. (2018). Optimization of PEF-assisted extraction of polyphenols from potato peels by using response surface methodology. ORAL PRESENTATION IFT-EFFoST 2018 International Nonthermal Processing Workshop and Short course, Sorrento/Salerno, 25-27 September 2018. |
| 16 | Carullo D., Pataro G., Ferrari G. (2018). Role of PEF and nanofiltration technologies in the biorefinery of artichoke wastes for the recovery of phenolic acids. ORAL PRESENTATION 32 nd EFFoST International Conference, Nantes, France, 6-8 November 2018. |

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| 17 | Carullo D., Pataro G., Ferrari G. (2019). Influence of raw material pre-treatment on the PEF-assisted extraction of valuable compounds from artichoke wastes. ORAL PRESENTATION 3 rd World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies, Toulouse, France, 3-6 September 2019. |
| 18 | Pataro G., Carullo D., Ferrari G. (2019). Use of Pulsed Electric Fields in a “hurdle” approach for the efficient recovery of water-soluble intracellular compounds from <i>A. platensis</i> microalgae cells. ORAL PRESENTATION 3 rd World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies, Toulouse, France, 3-6 September 2019. |
| 19 | Carullo D., Pataro G., Ferrari G. (2019). Effect of pulsed electric fields treatment parameters on the extractability of water-soluble intracellular compounds from <i>A. platensis</i> microalgae. POSTER PRESENTATION 3 rd World Congress on Electroporation and Pulsed Electric Fields in Biology, Medicine, Food & Environmental Technologies, Toulouse, France, 3-6 September 2019. |
| 20 | Bassani A., Fiorentini C., Duserm Garrido G., Carullo D., Spigno G. (2021). Kinetic Model of Wheat Straw Autohydrolysis Considering Heating and Cooling Phases. ORAL PRESENTATION. Engineering Future Food (EFF) 2021 (Remote modality), 23 – 26 May, 2021 |
| 21 | Pataro G., Eslami E., Carullo D., Ferrari G., (2021). Pulsed electric field-assisted green solvent extraction of valuable compounds from agro-food by-products. ORAL PRESENTATION. Thessaloniki 2021 - 8th International Conference on Sustainable Solid Waste Management (Remote modality), 23 – 26 June 2021. |

Data

12/10/2021

Luogo

Piacenza