

## Implementation Plan and Results

### Project PhytoPAW no. 361PED/2020 (November 1<sup>st</sup>,2020 – October 31<sup>st</sup>, 2022)

No.	Project phase / implementation period	Estimated results	Achieved results	Degree of achievement
1.	Phase 1 - <i>Identification of the requirements for the non-thermal plasma reactor</i> , November 1 <sup>st</sup> – December 31 <sup>st</sup> , 2020	<ul style="list-style-type: none"> <li>- A list of particular requirements for non-thermal plasma reactor based on consultations partners involved;</li> <li>- The plan for the realization of the non-thermal plasma reactor.</li> <li>- Project website design.</li> </ul>	<ul style="list-style-type: none"> <li>- A list of particular requirements for non-thermal plasma reactor based on consultations partners involved;</li> <li>- The plan for the realization of the non-thermal plasma reactor.</li> <li>- Project website design.</li> </ul>	100%
2.	Phase 2 - <i>Realization of the experimental model of non-thermal plasma reactor and evaluation the preliminary effects of the treatments performed</i> , January 1 <sup>st</sup> – December 31 <sup>st</sup> , 2021	<ul style="list-style-type: none"> <li>- Experimental laboratory model of the non-thermal plasma reactor and preliminary report on its operability;</li> <li>- Report on germination and cytogenetic analyses on wheat sprouts;</li> <li>- Report on the content of bioactive compounds in wheat sprouts;</li> <li>- Report on the bio-synthetic potential of wheat sprouts.</li> <li>- Minimum 1 participation in international scientific events;</li> <li>- minimum 2 papers in international conference volumes</li> <li>- updated project website</li> </ul>	<ul style="list-style-type: none"> <li>- Experimental laboratory model of the non-thermal plasma reactor and preliminary report on its operability;</li> <li>- Report on germination and cytogenetic analyses on wheat sprouts;</li> <li>- Report on the content of bioactive compounds in wheat sprouts;</li> <li>- Report on the bio-synthetic potential of wheat sprouts.</li> <li>- Participation to 19th International Conference on Plasma Physics and Applications &amp; 1st Workshop on Plasma Applications for Smart and Sustainable Agriculture, August 31 - September 3, 2021, Magurele, Bucharest, Romania with the paper: Capacitive power supplies for non-thermal plasma multi-reactors scale-up R. Burlica, D. Astanei, O. Beniuga, D.E. Cretu</li> <li>- Published papers:               <ol style="list-style-type: none"> <li>1. Non-thermal plasma T-shaped reactor for activated water production, R. Burlica, D. Astanei, D.E. Cretu, I.D. Dirlau, O. Beniuga, S. Padureanu, V. Stoleru, A. Patras, Environmental Engineering and Management</li> </ol> </li> </ul>	100%

			<p>Journal, vol. 20, no. 3, pp. 397-404, 2021  DOI:http://dx.doi.org/10.30638/eemj.2021.040</p> <p>2. The Influence of NTP Reactor Geometry on H2O2 Generation in Water, D.E.Cretu, D. Astanei, R. Burlica, O. Beniuga, D. Tesoi, Proc. of. 2020 International Conference and Exposition on Electrical And Power Engineering (EPE), 22-23 oct. 2020, Iasi, Romania, ISBN:978-1-7281-8126-4,  DOI:http://dx.doi.org/10.1109/EPE50722.2020.9305678</p> <p>- Books: „Plasma non-termica: Fundamente, Aplicatii, Analiza”, Authors: R. Burlica, D. Astanei, Editura PIM, Iasi, 2020, 325p, ISBN 978-606-13-5944-8.</p> <p>- updated project website</p>	
3.	<p>Phase 3 - <i>Determination of treatment conditions optimal, operational tests under pre-industrial conditions, adaptation and optimization of plasma technology to imposed conditions, January 1<sup>st</sup> – October 31<sup>st</sup>, 2022</i></p>	<ul style="list-style-type: none"> <li>- Report on oxidative chemical species concentration in wheat sprouts;</li> <li>- Report on optimal conditions of treatment;</li> <li>- Determination of the chemical profile of wheat sprouts treated with water plasma activated water;</li> <li>- Report on therapeutic antioxidant potential of wheat sprouts treated with plasma-activated water;</li> <li>- Plasma treatment system in optimized configuration, experimentally validated.</li> <li>- Minimum 2 papers published in ISI journals;</li> <li>- minimum 1 participation in events international scientific events;</li> <li>- minimum 2 papers in international</li> </ul>	<ul style="list-style-type: none"> <li>- Report on oxidative chemical species concentration in wheat sprouts;</li> <li>- Report on optimal conditions of treatment;</li> <li>- Determination of the chemical profile of wheat sprouts treated with water plasma activated water;</li> <li>- Report on therapeutic antioxidant potential of wheat sprouts treated with plasma-activated water;</li> <li>- Plasma treatment system for PAW production in optimized configuration, experimentally validated.</li> <li>- Participation to PSE Meeting 2022, Natural Products in Drug Discovery and Development – Advances and Perspectives, 19-22 September 2022, Iasi, Romania with the papers:</li> <li>1. Effect of non-thermal plasma activated water on the accumulation of bioactive compounds in wheat sprouts Alexandru Mandici, Daniel Eusebiu Crețu, Tudor George Aostăcioaiei, Dragoș Astanei, Denis Constantin Țopa, Anca Miron, Radu Burlică</li> </ul>	100%

		<p>conferences (ISI proceedings); - minimum 1 national patent application.</p>	<p>2. Exposure to non-thermal plasma activated water and cold stress to improve the antioxidant potential of sprouted wheat Ana Clara Aprotosoai, Crăița Roșu, Alexandru Mandici, Daniel Eusebiu Crețu, Tudor George Aostăcioaiei, Dragoș Astanei, Denis Constantin Țopa, Radu Burlică, Anca Miron</p> <p>3. Enhancing the nutritional and bioactive potential of sprouted grains: a focus on non-thermal plasma activated water technology Anca Miron, Alexandru Mandici, Cristina Lungu, Daniel Eusebiu Crețu, Dragoș Astanei, Radu Burlică, Ana Clara Aprotosoai</p> <p>Published papers:</p> <p>1. Nonthermal Plasma Multi-Reactor Scale-Up Using Pulse Capacitive Power Supplies, R. Burlica, D.E. Cretu, O. Beniuga, D. Astanei, Applied Sciences, vol 12(20), art. no. 10403, 2022 DOI:<a href="https://doi.org/10.3390/app122010403">https://doi.org/10.3390/app122010403</a></p> <p>2. Preliminary study on the impact of non-thermal plasma activated water on the quality of Triticum aestivum L. cv. Glosa sprouts, A. Mandici, D.E. Cretu, R. Burlica, D. Astanei, O. Beniuga, C. Rosu, D.C. Topa, T.G. Aostacioaiei, A.C. Aprotosoai, A. Miron, Horticulturae, 2022, Manuscript ID: horticulturae-2015979 - paper in review.</p> <p>3. Effects of non-thermal plasma activated water and cold temperature on wheat sprouts: a focus on photosynthetic pigments, protein and phenolic contents, antioxidant activity, antioxidant and prooxidant enzymes activity, Alexandru Mandici, Craita Rosu, Radu Burlica, Daniel Eusebiu Cretu, Dragos Astanei, Oana Beniuga, Denis Constantin Topa, Tudor George Aostacioaiei, Anca Miron, FARMACIA, 2022 - paper</p>	
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			<p>in review – Manuscript ID 456.</p> <p>4. Influence of Water Injection Technique in an Argon NTP System Used for PAW Generation, D.E. Cretu, S. Pellerin, R. Burlica, M. Wartel, D. Astanei, F. Faubert, Proc. of. 2022 International Conference and Exposition on Electrical And Power Engineering (EPE), 20-21 oct. 2022, Iasi, Romania, ISBN:978-1-7281-8126-4</p> <p>5. Assessment of HV Power Supply Efficiency in Plasma Activated Water Production, D.E. Cretu, C.C. Rusu, D. Astanei, R. Burlica, O. Beniuga, Proc. of. 2022 International Conference and Exposition on Electrical And Power Engineering (EPE), 20-21 oct. 2022, Iasi, Romania, ISBN:978-1-7281-8126-4</p> <p>- Patent demand: Dispozitiv cu plasma non-termica DBD-Corona pentru tratamentul substraturilor polimerice destinate ambalarii produselor alimentare, Authors: R. Burlica, D.G. Astanei, O.C. Beniuga, D.E. Cretu, C.C. Rusu. Patent demand OSIM registration no.:A00493/12.08.2022</p> <p>- updated project website</p>	
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