

Dr Chrysanthi Pateraki

Assistant Professor

Microbial Biotechnology

Department of Biochemistry and Biotechnology

University of Thessaly

**Research interests**

My research activity focuses on bioprocess and biorefinery development using renewable raw materials targeting on the production of biobased chemicals and polymers. My research includes fermentation optimization using bacterial, yeast and fungal strains towards improved fermentation efficiency and understanding the intracellular metabolic pathways via biochemical and molecular analysis. Moreover, my research focuses on utilization of novel technologies (bioelectrochemistry) to improve bioprocess development.

My research focuses on the following topics:

- Industrial fermentation and white biotechnology
 - Biorefinery development
 - Biochemical and bioprocess engineering.
 - Biomolecular engineering
 - Bioelectrochemistry and electrochemical membrane extraction
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Education

- 2018** PhD in Microbial Biotechnology, Department of Food Science and Human Nutrition, Agricultural University of Athens
- 2012** Master's degree in Viticulture and Enology, Department of Food Science and Technology and Department of Crop Science, Agricultural University of Athens
- 2010** Undergraduate degree, School of Biology, Aristotle University of Thessaloniki
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Research activities

- May 2023 - Today** **Assistant Professor** in the Department of Biochemistry and Biotechnology, University of Thessaly
- Mar 2018- May 2023** **Postdoctoral researcher** in the Department of Food Science and Human Nutrition, Agricultural University of Athens
- Oct 2012- Mar 2018** **PhD candidate** in the Department of Food Science and Human Nutrition, Agricultural University of Athens
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Publications

1. Techno-economic and environmental sustainability assessment of succinic acid production from municipal biowaste using an electrochemical membrane bioreactor, Sofia Maria Ioannidou, Eleni Stylianou, Chrysanthi Pateraki, Ioannis Kookos, Korneel Rabaey, Apostolis Koutinas, Dimitrios Ladakis, Chemical Engineering Journal, 473, 145070, 2023
2. Pretreatment of Grape Pomaces and Stalks Using Deep Eutectic Solvents for Succinic Acid Production Integrated in a Biorefinery Concept, Katiana Filippi, Eleni Stylianou, **Chrysanthi Pateraki**, Apostolis Koutinas, Dimitrios Ladakis, Waste and Biomass Valorization, 14, 2857–2872, 2023
3. Development of an electrochemical membrane bioreactor for succinic acid production and in situ separation with engineered *Yarrowia lipolytica* cultivated on municipal biowaste hydrolysate, Eleni Stylianou, José M. Carvajal-Arroyo, Dimitrios Ladakis, Carol Sze Ki Lin, Vera Eßmann, Sebastian Dörr, Jakob Marbach, Korneel Rabaey, Apostolis Koutinas, **Chrysanthi Pateraki** (*corresponding author*), Chemical Engineering Journal, 466, 142877, 2023
4. Spent coffee grounds and orange peel residues based biorefinery for microbial oil and biodiesel conversion estimation, Nikos Giannakis, Miguel Carmona-Cabello, Aikaterini Makri, David Leiva-Candia, Katiana Filippi, **Chrysanthi Pateraki**, M.P. Dorado, Apostolis Koutinas, Eleni Stylianou, Renewable Energy, 209, 382-392, 2023
5. Transcriptional regulation in key metabolic pathways of *Actinobacillus succinogenes* in the presence of electricity, **Chrysanthi Pateraki** (*corresponding author*) Elena Magdalinou, Dimitrios Skliros, Emmanouil Fletmetakis, Korneel Rabaey, Apostolis Koutinas, Bioelectrochemistry, 151, 108376, 2023
6. Circular PHB production via *Paraburkholderia sacchari* cultures using degradation monomers from PHB-based post-consumer bioplastics as carbon sources, Lina Zoghb, Dimitrios Skliros, Emmanouil Fletmetakis, Apostolis Koutinas, **Chrysanthi Pateraki** (*corresponding author*), Dimitrios Ladakis, Biochemical Engineering Journal, 191, 108808, 2023
7. Fermentative bioconversion of food waste into biopolymer poly(3-hydroxybutyrate-co-3-hydroxyvalerate) using *Cupriavidus necator*, Zubeen J. Hathi, Md Ariful Haque, Anshu Priya, Zi-hao Qin, Shuquan Huang, Chun Ho Lam, Dimitris Ladakis, **Chrysanthi Pateraki**, Srinivas Mettu, Apostolis Koutinas, Chenyu Du, Carol Sze Ki Lin, Environmental research, 215, 114323, 2022, <https://doi.org/10.1016/j.envres.2022.114323>
8. Valorisation of wheat milling by-products into bacterial nanocellulose via ex-situ modification following circular economy principles, Aikaterini Natsia, Erminta Tsouko, Maria-Nefeli Eythimiou, Aristeidis Papagiannopoulos, **Chrysanthi Pateraki** (*corresponding author*), Dimitrios Selianitis, Stergios Pispas, Kostas Bethanis, Apostolis Koutinas, Sustainable chemistry and pharmacy, 29, 100832, 2022, <https://doi.org/10.1016/j.scp.2022.100832>

9. Property evaluation of bacterial cellulose nanostructures produced from confectionery wastes, Maria-Nefeli Efthymiou, Erminta Tsouko, **Chrysanthi Pateraki** (*corresponding author*), Aristeidis Papagiannopoulos, Pavlos Tzamalīs, Stergios Pispas, Kostas Bethanis, Ioanna Mantala, Apostolis Koutinas, *Biochemical Engineering Journal*, 186, 108575, 2022. <https://doi.org/10.1016/j.bej.2022.108575>
10. Biorefinery development, techno-economic evaluation and environmental impact analysis for the conversion of the organic fraction of municipal solid waste into succinic acid and value-added fractions, Dimitrios Ladakis, Eleni Stylianou, Sofia-Maria Ioannidou, Apostolis Koutinas, **Chrysanthi Pateraki** (*corresponding author*), *Bioresource Technology*, 354, 127172, 2022. <https://doi.org/10.1016/j.biortech.2022.127172>
11. Valorization of the organic fraction of municipal solid waste for fumaric acid production and electrochemical membrane extraction using *Candida blankii*, Chrysanthi Tatsi, **Chrysanthi Pateraki** (*corresponding author*), Korneel Rabaey, Apostolis Koutinas, *Bioresource Technology reports*, 17, 100900, 2022, <https://doi.org/10.1016/j.biteb.2021.100900>
12. Chemical profiling, bioactivity evaluation and the discovery of a novel biopigment produced by *Penicillium purpurogenum* CBS 113139, Antonis D. Tsailanis, **Chrysanthi Pateraki** (*corresponding author*), Mary Kyriazou, Christos Chatzigiannis, Maria Chatziathanasiadou, Nikolaos Parisi, Ioanna Mandala, Andreas G. Tzakos, Apostolis Koutinas, *Molecules*, 27, 69, 2022, <https://doi.org/10.3390/molecules27010069>
13. Bioconversions of biodiesel-derived glycerol into sugar alcohols by newly isolated wild-type *Yarrowia lipolytica* strains, Eleni-Stavroula Vastaroucha, Sofia Maina, Savvoula Michou, Ourania Kalantzi, **Chrysanthi Pateraki**, Apostolis A. Koutinas and Seraphim Papanikolaou, *Reactions*, 2, 499–513, 2021. <https://doi.org/10.3390/reactions204003>
14. Restructuring the sunflower-based biodiesel industry into a circular bio-economy business model converting sunflower meal and crude glycerol into succinic acid and value-added co-products, Maria-Nefeli Efthymiou, **Chrysanthi Pateraki** (*corresponding author*), Harris Papapostolou, Carol Sze Ki Lin, Apostolis Koutinas, *Biomass and Bioenergy*, 155, 106265, 2021, <https://doi.org/10.1016/j.biombioe.2021.106265>
15. Integrated biorefinery development using winery waste streams for the production of bacterial cellulose, succinic acid and value-added fractions, Katiana Filippi, Harris Papapostolou, Maria Alexandri, Anestis Vlysidis, Eleni Myrtsi, Dimitrios Ladakis, **Chrysanthi Pateraki**, Serkos A. Haroutounian, Apostolis Koutinas, *Bioresource Technology*, *Bioresource Technology*, 125989, 2022, <https://doi.org/10.1016/j.biortech.2021.125989>
16. Optimization of fermentation medium for succinic acid production using *Basfia succiniciproducens*, Eleni Stylianou, **Chrysanthi Pateraki** (*corresponding author*), Dimitrios Ladakis, Anestis Vlysidis,

- Apostolis Koutinas, Environmental Technology & Innovation, 101914, 2021, <https://doi.org/10.1016/j.eti.2021.101914>
17. Bioprocess development using organic biowaste and sustainability assessment of succinic acid production with engineered *Yarrowia lipolytica* strain, Eleni Stylianou, **Chrysanthi Pateraki** (*corresponding author*)., Dimitrios Ladakis, Christina Damala, Anestis Vlysidis, Marcos Latorre-Sánchez, Caterina Coll, Carol Sze Ki Lin, Apostolis Koutinas, Biochemical Engineering Journal, 174, 108099, 2021. <https://doi.org/10.1016/j.bej.2021.108099>
 18. Bioprocess Development for 2,3-Butanediol Production by *Paenibacillus* Strains, Daniel Tinoco, **Chrysanthi Pateraki**, Apostolis A. Koutinas, Denise M. G. Freire, ChemBioEng Reviews, 8, 44-62, 2021. doi:10.1002/cben.202000022
 19. Fed-batch bioprocess development for astaxanthin production by *Xanthophyllomyces dendrorhous* based on the utilization of *Prosopis* sp. pods extract, Miguel Ángel Villegas-Méndez, Aikaterini Papadaki, **Chrysanthi Pateraki**, Nagamani Balagurusamy, Julio Montañez, Apostolis A. Koutinas, Lourdes Morales-Oyervides, Biochemical Engineering Journal, 166, 107844, 2021, doi.org/10.1016/j.bej.2020.107844
 20. Succinic acid production from pulp and paper industry waste: A transcriptomic approach, **Chrysanthi Pateraki** (*corresponding author*), Dimitrios Skliros, Emmanouil Fletmetakis, Apostolis Koutinas, Journal of Biotechnology, 325: 250-260, 2021, doi.org/10.1016/j.jbiotec.2020.10.015
 21. Sustainable production of bio-based chemicals and polymers via integrated biomass refining and bioprocessing in a circular bioeconomy context, Sofia Maria Ioannidou, **Chrysanthi Pateraki**, Dimitrios Ladakis, Harris Papapostolou, Maria Tsakona, Anestis Vlysidis, Ioannis K. Kookos, Apostolis Koutinas, Bioresource Technology, 307, 2020, doi.org/10.1016/j.biortech.2020.123093
 22. Evaluation of organic fractions of municipal solid waste as renewable feedstock for succinic acid production, Eleni Stylianou, **Chrysanthi Pateraki** (*corresponding author*), Dimitrios Ladakis, María Cruz-Fernández, Marcos Latorre-Sánchez, Caterina Coll, Apostolis Koutinas. Biotechnology for Biofuels, 13, 72, 2020. doi.org/10.1186/s13068-020-01708-w
 23. Indigenous yeasts: emerging trends and challenges in winemaking, Iliada K Lappa, Vasiliki Kachrimanidou, **Chrysanthi Pateraki**, Dionysios Koulougliotis, Effimia Eriotou, Nikolaos Kopsahelis, Current Opinion in Food Science, 32: 133-143, 2020, doi.org/10.1016/j.cofs.2020.04.004
 24. Direct electrochemical extraction increases microbial succinic acid production from spent sulphite liquor, **Chrysanthi Pateraki**, Stephen J Andersen, Dimitrios Ladakis, Apostolis Koutinas, Korneel Rabaey, Green Chemistry, 21, 2401-2411, 2019, Green Chemistry, doi.org/10.1039/C9GC00361D
 25. Valorisation of fruit and vegetable waste from open markets for the production of 2,3-butanediol, Vasiliki Liakou, **Chrysanthi Pateraki** (*corresponding author*), Anastasia-Marina Palaiogeorgou, Nikolaos Kopsahelis, Aline Machado de Castro, Denise Maria Guimarães Freire, George-John E.

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26. Microbial oil production from various carbon sources by newly isolated oleaginous yeasts, Sofia Maina, **Chrysanthi Pateraki** (*corresponding author*), Nikolaos Kopsahelis, Spiros Paramithiotis, Eleftherios H. Drosinos, Seraphim Papanikolaou, Apostolis Koutinas, Engineering in Life Sciences, 00, 1–12, 2016, doi:10.1002/elsc.201500153
27. Succinic acid production by *Actinobacillus succinogenes* from batch fermentation of mixed sugars, Henrik Almqvist, **Chrysanthi Pateraki**, Maria Alexandri, Apostolis Koutinas, Gunnar Lidén, Journal of Industrial Microbiology & Biotechnology 43 (2016) 1117-1130. doi:10.1007/s10295-016-1787-x
28. Pretreatment of spent sulphite liquor via ultrafiltration and nano-filtration for bio-based succinic acid production, **Chrysanthi Pateraki**, Dimitris Ladakis, Lutgart Stragier, Willy Verstraete, Ioannis Kookos, Seraphim Papanikolaou, Apostolis Koutinas, Journal of Biotechnology, 233, 95-105, 2016, doi:10.1016/j.jbiotec.2016.06.027
29. Modeling succinic acid fermentation using a xylose based substrate, **Chrysanthi Pateraki**, Henrik Almqvist, Dimitris Ladakis, Gunnar Liden, Apostolis A Koutinas, Anestis Vlysidis, Biochemical Engineering Journal, 113, 26-41, 2016, doi:10.1016/j.bej.2016.06.011
30. *Actinobacillus succinogenes*: Advances on succinic acid production and prospects for development of integrated biorefineries, **Chrysanthi Pateraki**, Maria Patsalou, Anestis Vlysidis, Nikolaos Kopsahelis, Colin Webb, Apostolis A. Koutinas, Michalis Koutinas. Biochemical Engineering Journal 112 (2016) 285-303. doi:10.1016/j.bej.2016.04.005
31. Effect of sulfur dioxide addition in wild yeast population dynamics and polyphenolic composition during spontaneous red wine fermentation from Vitis vinifera cultivar Agiorgitiko., **Chrysanthi Pateraki**, Spiros Paramithiotis, Agapi I. Doulgeraki, Stamatina Kallithraka, Yorgos Kotseridis, Eleftherios H. Drosinos, European Food Research and Technology 239 (2014) 1067–1075. doi:10.1007/s00217-014-2303-z
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Book Chapters

1. Lactic Acid Bacteria as Cell Factories: Synthetic Biology and Metabolic Engineering, Chapter 7: Lactic acid bacterial cell factories for the production of gamma-aminobutyric acid, Spiros Paramithiotis, **Chrysanthi Pateraki**, <https://www.sciencedirect.com/science/article/abs/pii/B9780323919302000171>
2. Lactic Acid Bacteria as Cell Factories: Synthetic Biology and Metabolic Engineering, Chapter 6: Lactic acid bacteria for riboflavin production, Spiros Paramithiotis, **Chrysanthi Pateraki**, <https://www.sciencedirect.com/science/article/abs/pii/B9780323919302000171>

3. The Handbook of Polyhydroxyalkanoates, Postsynthetic Treatment, Processing and Application, Chapter 8: Competitive Advantage and Market Introduction of PHA Polymers and Potential Use of PHA Monomers, Konstantina Kourmentza, Vasiliki Kachrimanidou, Olga Psaki, **Chrysanthi Pateraki**, Dimitrios Ladakis, Apostolos Koutinas, <https://www.taylorfrancis.com/books/e/9781003087663/chapters/10.1201/9781003087663-11>
 4. Comprehensive Biotechnology (Third Edition), Volume 2: Engineering Perspectives in Biotechnology, Chapter 2.59: Biorefinery Engineering, **Chrysanthi Pateraki**, Aikaterini Papadaki, Vasiliki Kachrimanidou, Apostolis Koutinas, Elsevier, 2019
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Conferences

1. Lina Zoghbi and Chrysanthi Pateraki. Poly(3-hydroxybutyrate) enzymatic recycling and upcycling of hydrolysate as carbon source using degradation products, 20th International Conference on Renewable Resources and Biorefineries, Brussels, 5-7 June 2024, (Oral presentation by Lina Zoghbi)
 2. Chrysanthi Pateraki, Eleni Stylianou, Korneel Rabaey, Apostolis Koutinas, Valorization of the Organic Fraction of Municipal Solid Waste: Improving Process Efficiency Via Biomass Refining and in Situ Electrochemical Separation of Bio Based Products, 2019 AIChE Annual Meeting, Orlando, Florida, USA, 10-15 November 2019, (Oral presentation by Chrysanthi Pateraki)
 3. Pateraki Chrysanthi, Derveni Eleni, Gkatzogia Melissanthi, Rabaey Korneel, Koutinas Apostolos, Bioprocess development using municipal solid waste for the production of crude enzymes and fumaric acid in electrochemical bioreactor, The 12th EUROPEAN CONGRESS OF CHEMICAL ENGINEERING, Florence, Italy, 15-19 September 2019, (Oral presentation by Chrysanthi Pateraki)
 4. Chrysanthi Pateraki, Eleni Stylianou, Apostolis Koutinas, Bioprocess development using the biowaste fraction of municipal solid waste for the production of crude enzymes and succinic acid, XIII Seminario Brasileiro de de Tecnologia Enzimatica (ENZITEC), Floripa, Brazil 16-19 September 2018, (Invited oral presentation)
 5. Chrysanthi Pateraki, Stephen Andersen, Apostolis Koutinas, Korneel Rabaey. Enhanced succinic acid production by *Basfia succiniciproducens* through integrated fermentation with electrolytic membrane extraction. 10th World Congress of Chemical Engineering, Barcelona, Spain, 1-5 October 2017, (Oral presentation by Chrysanthi Pateraki)
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Funding

Project Title	Funding source	Submission date	Role of the PI
Refining of municipal solid biowaste and advanced electrochemical bioprocess development for the production and enzymatic recycling of bio-based poly(3-hydroxybutyrate), (Acronym: Biowaste2Plastics)	HFRI - 3rd Call for H.F.R.I. Research Projects to Support Post-Doctoral Researchers	2023 – present (ongoing)	<i>Principal Investigator</i> , Management, coordination, dissemination, scientific work