

Carolina Astudillo

Full Time Professor

Escuela de Alimentos

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About me:

I teach undergraduate classes for Food Engineering students, and I am a faculty member of the Doctoral Program in Agri-food Sciences in our Faculty University.

I'm also Head of Outreach, and I'm Dean of our Faculty.

Research Interest:

- Membrane Technology
- Edible hydrocolloidal films
- Bioactive compounds recovery from agro waste

Education

1998: Biochemical Engineer – Pontificia Universidad Católica de Valparaíso (PUCV), Chile.

2006: MSc. Biochemical Engineering – PUCV, Chile.

2010: PhD. Biochemical Engineering – PUCV, Chile.

2014: Diploma in University Teaching – Pontificia Universidad Católica de Valparaíso, Chile.

2014: Diploma in Social Responsibility and Prosociality – PUCV, Chile.

2015: Diploma in Learning Evaluation – PUCV, Chile.

2020: Diploma in Virtual Teaching – PUCV, Chile.

2020: International Diploma in Innovation– PUCV, Chile

Current Research Project

FONDECYT REGULAR – ANID Chilean Grant [1211551]: “Hydrocolloid based edible coatings as strategy to produce healthier french fries options” (2021-2024).
Co researcher

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Chilean Patent

Procedure for preparing a powdered ingredient based on quinoa protein concentrate with the addition of essential oils with antioxidant properties and plant wall material, as well as said product obtained and its application. Universidad de Santiago de Chile (80%) & Pontificia Universidad Católica de Valparaíso (20%). Número de Solicitud Nacional 2016 003429. Fecha de solicitud: 31-12-2016. Fecha de Concesión: 11-09-2019.-

Projects

FONDECYT REGULAR 1211551 Hydrocolloid-based edible coatings as strategy to produce healthier French-fries options. 2021-2023. Main researcher.

FONDECYT Regular 1161293 "Enzymatic membrane reactor for the hydrolysis of fish by-product proteins", 2016-2018, Co Researcher.

Proyecto Fondecyt de iniciación, 11110402 "Study and optimization of two stage microfiltration process' global productivity, for skim milk shelf life's extension and casein concentrate production, using an operational strategy involving fouling control by time variable transmembrane pressure", Main researcher., 2011-2014.

Papers ISI

1. Pedro Valencia, Karen Espinoza, Carolina Astudillo-Castro and Fernando Salazar (2022) Modeling Tool for Studying the Influence of Operating Conditions on the Enzymatic Hydrolysis of Milk Proteins. *Foods*. 11(24), 4080; <https://doi.org/10.3390/foods11244080>
2. Alejandra Arancibia-Díaz, Carolina Astudillo-Castro, Claudia Altamirano, Carmen Soto-Maldonado, Mauricio Vergara-Castro, Andrés Córdova, María Elvira Zúñiga-Hansen (2023) Development of solid-state fermentation process of spent coffee grounds for the differentiated obtaining of chlorogenic, quinic, and caffeic acids. *J Sci Food Agric* 103(1):420-427. doi: 10.1002/jsfa.12156.
3. Andrés Córdova, Paola Henríquez, Helena Núñez, Fabián Rico, Cecilia Guerrero, Carolina Astudillo-Castro, Andrés Illanes (2022) Recent advances in the application of enzyme processing assisted by ultrasound in agri-foods: a review. *Catalysts*. 12:1, 107. <https://doi.org/10.3390/catal12010107>
4. Pedro L. Valencia, Bastián Sepúlveda, Diego Gajardo and Carolina Astudillo-Castro (2020) Estimating the Product Inhibition Constant from Enzyme Kinetic Equations Using the Direct Linear Plot Method in One-Stage Treatment. *Catalysts* 10, 853.
5. Carolina Astudillo-Castro, Andrés Cordova, Vinka Oyanedel-Craver, Carmen Soto-Maldonado, Pedro Valencia, Paola Henríquez and Rafael Jimenez-Flores (2020) Prediction of the Limiting Flux and Its Correlation with the Reynolds Number during the Microfiltration of Skim Milk Using an Improved Model. *Foods*. 9, 1621.
6. Andrés Córdova, Carolina Astudillo-Castro, René Ruby-Figueroa, Pedro Valencia & Carmen Soto (2020) Recent advances and perspectives of ultrasound assisted membrane food processing *Food Research International* 133, 109163.
7. Luciana Santibáñez, Andrés Córdova, Carolina Astudillo-Castro & Andrés Illanes (2019) Effect of the lactose hydrolysis on galacto-oligosaccharides mixtures subjected to nanofiltration: A detailed fractionation analysis. *Separation and Purification Technology*. 222: 342-351
8. Pedro Valencia, Tamara Solis, Paula Rojas, Francisco Ibañez, Carolina Astudillo-Castro, Marlene Pinto & Sergio Almonacid. (2019) Proteolytic susceptibility of food by-product proteins: An evaluation by means of a quantitative index. *Process Biochemistry*. 77, 63-69.
9. Andrés Córdova, Jorge Saavedra, Valentina Mondaca, Juan Vidal, Carolina Astudillo-Castro (2018) Quality assessment and multivariate calibration of 5-Hydroxymethylfurfural during a concentration process for clarified apple juice. *Food Control*.
10. F. Faghihzadeh, N. M. Anaya, C. Astudillo-Castro & V. Oyanedel-Craver (2018) Kinetic, metabolic and macromolecular response of bacteria to chronic nanoparticle exposure in continuous culture. *Environmental Science: Nano*. 10.1039/C8EN00325D
11. Pedro Luis Valencia; Carolina L Astudillo; Diego Gajardo; Sebastián A Flores (2017) Application of the median method to estimate the kinetic constants of the substrate uncompetitive inhibition equation. *Journal of Theoretical Biology*. 418:122-128.
12. Jorge Saavedra, Andrés Córdova, Rosa Navarro, Paulo Díaz-Calderón, Claudia Fuentealba, Carolina Astudillo-Castro, Lea Toledo, Javier Enrione & Lena Galvez (2017) Industrial avocado waste: Functional compounds preservation by convective drying process. *Journal of Food Engineering* 198:81-90.

13. NAVARRO-LISBOA, Rosa; HERRERA, Camila; ZÚÑIGA, Rommy N; ENRIONE, Javier; GUZMÁN, Fanny; MATIACEVICH, Silvia; ASTUDILLO-CASTRO, Carolina (2017) Quinoa proteins (*Chenopodium quinoa* Willd.) fractionated by ultrafiltration using ceramic membranes: The role of pH on physicochemical and conformational properties. *Food and Bioproducts Processing*. 102:20-30.
14. Andrés Córdova, Carolina Astudillo, Luciana Santibañez, Alfredo Cassano, René Ruby-Figueroa, Andrés Illanes (2017) Purification of galacto-oligosaccharides (GOS) by three-stage serial nanofiltration units under critical transmembrane pressure conditions. *Chemical Engineering Research and Design*. 117:488-499.
15. Cordova A., Astudillo C., Guerrero C., Vera C. & A. Illanes (2016) Performance of an ultrafiltration membrane bioreactor (UF-MBR) as a processing strategy for the synthesis of galacto-oligosaccharides at high substrate concentrations. *Journal of Biotechnology*. 223:26-35
16. Cordova A., Astudillo C., Giorno L., Guerrero C., Conidi C., Illanes A. & A. Cassano (2016) Nanofiltration potential for the purification of highly concentrated enzymatically produced oligosaccharides. *Food and Bioproducts Processing Official journal of the European Federation of Chemical Engineering: Part C*. 98: 50-61.
17. Cordova A., Astudillo C., Guerrero C., Vera C. & A. Illanes (2016) Assessment of the fouling mechanisms of an ultrafiltration membrane bioreactor during synthesis of galacto-oligosaccharides: Effect of the operation variables. *Desalination*. 393: 79-89.
18. Astudillo-Castro C. (2015) Limiting flux and critical transmembrane pressure determination using an exponential model: The effect of concentration factor, temperature and cross-flow velocity during casein micelle concentration by microfiltration. *Industrial & Chemical Engineering Research*. 54 (1), 414–425
19. Cifuentes-Araya N., Astudillo-Castro C. & L. Bazinet (2014) Mechanisms of mineral membrane fouling growth modulated by pulsed modes of current during electrodialysis: Evidences of water splitting implications in the appearance of the amorphous phases of magnesium hydroxide and calcium carbonate *Journal of Colloid and Interface Science*, 426: 221-234.
20. Cancino B., Ruby R., Astudillo C., Saavedra J. & M. Lutz (2012) Analysis of the membrane fouling mechanisms involved in clarified grape juice ultrafiltration using statistical tools. *Industrial & Engineering Chemistry Research*. 51, 4017-4024.
21. Astudillo C., Gonzalez, S., Parra J. & B. Cancino (2010) A new parameter for membrane cleaning evaluation. *Separation and Purification Technology*. 73: 286–293.
22. Astudillo C. & Acevedo F. (2009) Effect of CO₂ Air Enrichment in the Biooxidation of a Refractory Gold Concentrate by *Sulfolobus Metallicus* Adapted to High Pulp Densities. *Hydrometallurgy*. 97: 94–97.
23. Astudillo C. & Acevedo F. (2008) Adaptation of *Sulfolobus metallicus* To High Pulp Densities in the Biooxidation of a Refractory Gold Concentrate". *Hydrometallurgy*, 92: 11–15.
24. Simpson R., Astudillo C. & F. Acevedo (2005) "A new methodology for the optimal design of batch fermentation plants". *Biochemical Engineering Journal*. 27:155–160

Other Papers

1. Calculation of statistic estimates of kinetic parameters from substrate uncompetitive inhibition equation using the median method. (2017) *Data in Brief*. Pedro Luis Valencia All Authors: Pedro L. Valencia; Carolina Astudillo-Castro; Diego Gajardo; Sebastián Flores (SCOPUS).
2. Salazar FN., M. Labbé, Carrasco M., Astudillo C., Ulloa P. & F López (2014) "Residual antigenicity of partially hydrolysed cow's milk proteins". *Revista Facultad de Agronomía*. 67(2) S 1018-1020. (SCIELO)
3. Astudillo C., Sánchez F., Saavedra J. & A. Poblete (2014) "Hidratación de micelas de caseínas contenidas en leche en polvo descremada". *Revista Facultad de Agronomía*. 67(2) S 907-909. (SCIELO)
4. Astudillo C., Sánchez F., Saavedra J. & A. Poblete (2014) "Concentración de micelas de caseína por microfiltración: Escalamiento de un módulo de membranas". *Revista Facultad de Agronomía*. 67(2) S 409-411. (SCIELO)
5. Saavedra J., Córdova A., Astudillo C., Ulloa P. & L. Toledo (2014) Análisis de Vida Útil Multivariante en alimentos: sensibilización de la ponderación de variables en estudio mediante Orthogonal Partial Least Square (O-PLS). *Revista Facultad de Agronomía*. 67(2) S 314-316. (SCIELO)
6. Saavedra J., Romero N., Sepúlveda B., Tapia F., Córdova A., Astudillo C. & L. Toledo (2014) Caracterización y clasificación de aceites de oliva en base a condiciones de precosecha mediante análisis de componentes principales y orthogonal partial least square (o-pls). *Revista Facultad de Agronomía*. 67(2) S 186-188. (SCIELO)
7. Astudillo C. & B. Cancino (2012) Correlation between Reynolds Number and Limit Flux During Skim Milk Microfiltration. *Procedia Engineering*, 44: 1681-1683. Scopus
8. Astudillo, C.; Cancino B. & González S. (2011) "Microfiltración de leche descremada para la obtención de un concentrado de micelas de caseínas". *Revista AgroSur* 39(S): 7-8.
9. Astudillo, C.; Navarro R. & González S." Efecto del factor de concentración sobre los parámetros de operación durante la microfiltración de leche descremada". (2011) *Revista AgroSur* 39(S) 9-10.

10. Saavedra, J.; Puente, L.; Cancino, B. y Astudillo, C. (2010) Monitoreo y análisis de un proceso de elaboración de una bebida carbonatada mediante 3-Way PLSR. *Revista Información Tecnológica* 21(6): 59-66.
11. Astudillo C., Saavedra J & B. Cancino (2009) "Determination of colloid osmotic pressure through water activity for biological fluids" *New Biotechnology*, 25 (1): S180.
12. Cancino B., Ulloa L. & Astudillo C. (2008) Presión osmótica de soluciones salinas y azucaradas: su influencia en Osmosis Inversa en la industria de alimentos. *Información Tecnológica*. 20 (3): 55-64.
13. Cancino B., Kaiser S., Kasahara I., Diaz P., Alvarez J. & C. Astudillo (2008) Pulsed ultraviolet radiation, microfiltration and chlorine dioxide on *Alycyclobacillus acidoterrestis*. *Journal of Biotechnology* 136: S718
14. Astudillo C., González P., Gentina J.C. & F. Acevedo (2008) Effect of pulp densities on the bioleaching capacity of an adapted strain of *S. metallicus*. *Journal of Biotechnology* 136: S482
15. Astudillo C., González S. & Cancino B. (2008) Chemical Cleaning of Ceramic Membranes Fouled With Goat Milk. *Journal of Biotechnology*. 136: S497