



CURRICULUM VITAE

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1. Personal Background

Associate professor, University of Chile, Department of Chemical Engineering and Biotechnology,
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2. Education

Ph.D., Molecular Biology and Biochemistry, University of Chile, 1997
Focus: Bacterial biolixiviation, recombinant proteins, tyrosyl tRNA synthetase
Dissertation: Studies on the regulation of the *Thiobacillus ferrooxidans* tyrosyl tRNA synthetase gene expression.

B.A., Biochemistry, University of Concepcion, 1988
Focus: bacterial genetic, translation process, ribosomal RNA
Thesis: Cloning of rRNA genes from *Thiobacillus ferrooxidans*

3. Training

Short courses:

Bioinformatic: Computer Methods in Molecular Biology", International Centre for Genetic and biotechnology, 1998, Trieste, Italy

Biogenesis of plant organelles", Faculty of Biological Sciences, Catholic University of Chile, 1989. Santiago, Chile.

X Internacional Course in Molecular biology techniques. Faculty of Medicine, University of Chile, 1988, Santiago, Chile.

Research training

Chemical Engineering and Chemistry Division, California Institute of Technology, USA, February 2002-February 2003 Advisor Dr Frances Arnold
Focus: Protein engineering using directed evolution methods

4. Scientific expertise

Protein engineering of glycosyl hydrolases
Recombinant expression of proteins with biotechnological importance
Biofuels

5. Fellowships

Doctorial Fellowship, CONICYT, 1988-1992
Visiting Professor Fellowship Fulbright, 2002-2003

6. Work experience

1997 to date

Associate professor. Centre for Biochemical Engineering and Biotechnology, Department of Chemical Engineering and Biotechnology, Faculty of Physical Sciences and Mathematics, University of Chile.

1992-1996:

Research assistant, Department of Biochemistry, Faculty of Medicine, University of Chile

7. Teaching experience

Courses. Department of Chemical Engineering and Biotechnology, University of Chile

Biology and Biotechnology (since 1997)
Molecular Biology I (since 1997)
Molecular Biology II (since 1997)
Biochemistry (since 2004)
Modern Techniques in Biotechnology (since 1999)
Laboratory of Advanced Biotechnological processes (since 1997)
Bioinformatic (since 2011)
Genetic Engineering (since 2001)

Supervised Thesis (last 5 years)

Grade thesis

Werner Houzvic. Study of the cellulolytic potential of *Phanerochaete chrysosporium* cellulases on *Eucalyptus globulus* hydrolysis. Master in Engineering Sciences. Facultad de Ciencias Físicas y Matemáticas U de Chile. 2011.

Constanza Cohens. Recombinant expression of an endoglucanase from *Trametes versicolor*. Master in Engineering Sciences. Facultad de Ciencias Físicas y Matemáticas U de Chile. 2009

Iván Gajardo. Recombinant expression and modification of a fungal cellobiohydrolase for the production of bioethanol from lignocellulosic residues. Master in Environmental Sciences, Facultad de Farmacia Universidad de Chile. 2009

Javier Jofré. Improvement of the enzyme thermostability using methods for structure prediction. Master in Engineering Sciences. Facultad de Ciencias Físicas y Matemáticas U de Chile. 2009

Marcela Vega. Protein engineering in a fungal cellulase: optimization of the hydrolytic properties. Master in Engineering Sciences. Facultad de Ciencias Físicas y Matemáticas U de Chile. 2009

Mónica Guzmán. Analysis of the *Eucalyptus globulus* CBF-1 gene promoter. Master in Engineering Sciences. Facultad de Ciencias Físicas y Matemáticas U de Chile. 2008

Undergrade thesis

Manzano, Lisset. Study of production of auxiliary proteins for the cellulose hydrolysis by white rot fungi. Civil Engineer in Biotechnology. University of Chile. 2012

Buldrini, M. Teresa. Identification of residues for cellulose affinity in a endoglucanase using molecular docking. Civil Engineer in Biotechnology. University of Chile.2011

Salinas, Alejandro. Identification, gene cloning and expression of an endoglucanase for the production of bioethanol. Civil Engineer in Biotechnology.2010

Muñoz, Pablo. Análisis de los perfiles de expresión de genes relacionados con el crecimiento de baya en uva de mesa, en fenotipos contrastantes en tamaño de baya y semilla. Civil Engineer in Biotechnology.2009

Guerrero, Alejandra. Identification, cloning and recombinant expression of an exoglucanase to be used in the bioethanol production Civil Engineer in Biotechnology.2009

Marin, Romela. Characterization and recombinant expression of an Antarctic cellulase. Civil Engineer in Biotechnology.2007

Rodriguez, Vida
Evaluation of *Bacillus megaterium* as a host system for recombinant expression of subtilisin-like proteases from Antarctic origin. Civil Engineer in Biotechnology.2007

8. Research (last 5 years)

2012- 2015. Improvement of the lignocellulose hydrolysis by use of auxiliary enzymes. Fondecyt 1121088. Principal investigator.

2012-2014. Development of protein purification methods combining affinity precipitation by flexible chain charged polymers and hydrophobic interaction chromatography (HIC) CONICYT-MINCYT-2011-571-CH/11/16. Co-investigador

2012-2013. Support to International Networks between Research Centres 2011. ICDB Chile-National Engineering Research Center for Non-food Biorefinery, Guangxi Academy of Sciences China. Programa de Cooperación Científica Internacional Chile-China 2011-081. Co-investigador.

2011-2012. CONICYT Bilateral Cooperation Programme. Support to International Networks between Research Centres: Bioproducts Discovery & Development Centre (University of British Columbia- University of Guelph and Biocomsa-University of Chile. Conicyt VI-2010 065, Chile. Co-investigador

2008-2011. Optimization of the lignocellulose pretreatment for the obtention of bioethanol. Domeyko Program. Vicerrectoría de Investigación y Desarrollo, Universidad de Chile. Co-investigador.

2008-2010. Optimal processes for lignocellulose pretreatment for bioethanol production. Conicyt, Chile and the Finland Academy of Sciences. Co-investigador.

2008-2011. Effects of Hydrophobic Polypeptide Tag Fusion on Protein Purification by Hydrophobic Interaction Chromatography. Fondecyt. Co-investigador.

9. Publications

Book Chapters

1. **Salazar, O.** 2008 Bacteria and yeast cells disruption using lytic enzymes. In Sample Preparation and Pre-Fractionation for 2D PAGE: Methods and Protocols in Expression Proteomics. En Methods on Molecular Biology **424**, pág. 23-34. Ed. A. Posch, Humana Press:Totowa, New Jersey, USA.
2. **Salazar O**, Sun L. 2003. Directed Enzyme Evolution Screening and Selection Methods pp. En Methods in Molecular Biology, **230**, 85-98. Ed. Arnold, F.H y Georgiou G. Humana Press, Totowa, New Jersey.

International- Peer reviewed journals (last 5 years)

1. Salinas A., Vega M., Lienqueo ME., Garcia A., Carmona R., Salazar O. 2011. Cloning of novel cellulases from cellulolytic fungi: heterologous expression of a family 5 glycoside hydrolase from *Trametes versicolor* in *Pichia pastoris* Enzyme and Microbial Technology 49, 485-491.
2. Carmona, R., Garcia, A., Salazar O., Lienqueo ME. Liquid biofuels in Chile: The current status. Energy (in press) doi:10.1016/j.energy.2010.06.005.
3. Lienqueo ME., Shene C., Quiroga A., Salazar O., Salgado JC., Asenjo JA. 2010. Experimental validation of mathematical model predictions for the selection of optimal polypeptide tags to assist the purification of recombinant proteins. Separation Science and Technology 45, 2153-2164.
4. Pezoa R., Cortinez V., Hyvärinen S., Reunanen M., Hemming J., Lienqueo ME., Salazar O., Carmona R., Garcia A., Murzin D. Yu., Mikkola JP. 2010 The use of ionic liquids in the pretreatment of forest and agricultural residues for the production of bioethanol. Cellulose Chemistry and Technology 44, 165-172.
5. Palza H., Gutierrez S., Delgado K., Salazar O., Fuenzalida v., Avila J.J., Figueroa G., Quijada R. 2010. Toward Tailor-Made Biocide Materials Based on Poly(propylene)/Copper Nanoparticles. Macromolecular Rapid Communications. 31, 563-567.
6. Carmona, R., Lienqueo, ME., Salazar, O., García A.2009. Bioenergy II: Biological Pretreatment with Fungi as a Tool for Improvement of the Enzymatic Saccharification of Eucalyptus globulus Labill to Obtain Bioethanol. International Journal of Chemical Reactor Engineering. 7, A77.
7. Escobar B, Bustos K, Morales G. y Salazar O. 2008. Rapid and specific detection of *A. ferrooxidans* and *L. ferrooxidans* by PCR. Hydrometallurgy 92, 102-106.
8. Lienqueo ME, Salazar O, Calado CRC, Fonseca LP y Cabral JMS. 2008 Influence of tryptophan tags on the purification of cutinase, secreted by a recombinant *Saccharomyces cerevisiae*, using cationic expanded bed adsorption and hydrophobic interaction chromatography. Biotechnology Letters 30, 1353-1358.
9. Parra LP, Reyes F, Acevedo JP, Salazar O, Andrews BA, Asenjo JA. 2008. Cloning and fusion expression of a cold-active lipase from marine Antarctic origin. Enzyme and Microbial Technology 42, 371-377.
10. Acevedo JP, Reyes F, Parra LP, Salazar O, Andrews BA, Asenjo JA. 2008. Cloning of complete genes for novel hydrolytic enzymes from Antarctic sea water bacteria by use of an improved genome walking technique. J Biotechnol 133, 277-86.

11. Salazar O, Asenjo JA. 2007. Enzymatic lysis of microbial cells. *Biotechnology Letters*, 2, 985- 994.
12. Lienqueo ME, Salazar O, Henriquez K, Calado CRC, Fonseca LP, Cabral JMS. 2007, Prediction of retention time of cutinases tagged with hydrophobic peptides in hydrophobic interaction chromatography. *Journal of chromatography A*. 1154, 460-463.
13. Salazar O, Basso C, Barba P, Orellana C, Asenjo JA, 2006. Improvement of the Lytic Properties of a beta-1,3-Glucanase by Directed Evolution. *Mol. Biotechnology*. 33, 211-220.

10. Meetings Attendance (last 5 years)

1. **Salazar O**, Gajardo I, Salinas A, Vega M, Lienqueo ME, Carmona R, Garcia A. Heterologous Expression And Characterization Of Novel Cellulases From White Rot Fungi. 14th International Biotechnology Symposium and Exhibition. *Biotechnology for the Sustainability of Human Society*. Rimini, Italy, September 14-18, 2010.
2. **Salazar O**. Domeyko initiative for energy. Contributions to the second generation bioethanol process. International workshop "Bioenergy for a sustainable development. Biofuels: Challenges in Technologies and Markets. Valparaíso – Chile 24 – 25 September 2009
3. Salinas, A., Guerrero A., Gajardo I., Vega M., Lienqueo ME., Carmona R., Garcia A., Silva R., **Salazar O**. Identification and cloning of novel cellulase genes from white rot fungi. 14^o European Congress on Biotechnology; Symbiosis: Science Industry and Society, Barcelona, Spain. September 13-16, 2009
4. **Salazar O**. Guerrero A. Identification of cellulase enzymes for bioethanol production from lignocellulosic biomass. II Congreso Latinoamericano de Biorefinería. Concepción, Chile. 4 - 6 Mayo, 2009.
5. **Salazar O**., Marin R., Lienqueo, ME. Cold Active Cellulase For Bioethanol Production From Lignocellulosics Under A Simultaneous Saccharification And Fermentation (SSF) Process. *Bioenergy - II: Fuels and Chemicals from Renewable Resources*. 8-13 de Marzo 2009, Rio de Janeiro, Brasil.
6. Carmona R, Lienqueo ME, **Salazar O**., García A. Biological Pretreatment With Fungi As A Tool For Improvement Of The Enzymatic Saccharification Of Eucalyptus Globulus Labill To Obtain Bioethanol. *Bioenergy - II: Fuels and Chemicals from Renewable Resources*. 8-13 de Marzo 2009, Rio de Janeiro, Brasil.
7. Lienqueo M.E., Pezoa R., Cortinez V., **Salazar O**. Evaluation Of Pretreatment With Ionic Liquids For Enzymatic Hydrolysis Of Lignocellulosic Materials To Obtain Bioethanol. *Bioenergy - II: Fuels and Chemicals from Renewable Resources*. 8-13 de Marzo 2009, Rio de Janeiro, Brasil.
8. **Salazar O**. Initiatives for Production of Second Generation Bioethanol in Chile. *Canadá Chile 2th Workshop on Science and Technology*. Organizado por la Academia de Ciencias de Chile y RSC, the Academy of the Arts, Humanities and Sciences of Canadá: país Canadá, ciudad: Ottawa, Fecha 4-6 Mayo, 2008
9. Carmona R, Silva, R, Vicuña, C, Villaseñor, F, Lienqueo ME, **Salazar O**. 2007. Efficiency of enzymatic saccharification of wood of Eucalyptus globulus labil, pre-treated with white rot fungus in order to obtain bioethanol *Actas- III Congreso Iberoamericano de Productos Forestales Madereros y no Madereros*. ISSN1851-0973.- 3 al 5 de Julio, Buenos Aires. Argentina.

10. **Salazar O.** y Marin R. Characterization and gene cloning of two novel, cold adapted and alkali-tolerant cellulases from marine bacteria. Congreso Enzyme Engineering XIX organizado por la Engineering Conferences Internacional (ECI). País, Canadá, Ciudad Harrison Hot Spring. Fecha: 23-28 Septiembre 2007
11. Escobar B, Holzer K, Bustos K, and **Salazar O.** 16SDNA uses to identify and quantify bacteria in the bioleaching process. . En: Menacho J. M. y Casas J. (Eds) Proceedings of the IV International Copper Hydrometallurgy Workshop. May 16-18, 2007 Viña del Mar, Chile. 158-163.

November, 2012