

Shiva Hemmati

Personal Information:

First name: Shiva

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Academic Position:

March 2018-Present: **Associate Professor**, Department of Pharmaceutical Biotechnology, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

November 2012-February 2018: **Assistant Professor**, Department of Pharmaceutical Biotechnology, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

Education:

March 2008-March 2011: **Postdoctoral Fellow**, Department of Biochemistry, Purdue University, West Lafayette, Indiana, USA.

November 2003-November 2007: **Ph.D.** in Natural Sciences, Plant Molecular Biology, Institute for developmental and molecular Biology of Plants, Heinrich-Heine University, Duesseldorf, Germany.

1996-2003: Pharmacy Doctorate (**Pharm.D.**), School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

Research Interests:

- Protein delivery by penetrating peptides.
- Thermostable industrial enzymes.
- In silico* genome wide analysis.
- Characterization of the biosynthetic pathways of secondary metabolites.
- Sustainable biofuels: Manipulation of lignin biosynthesis to maximize cell wall digestibility and ethanol production.

Publications:

- 1) Sadeghian I, Khalvati B, Ghasemi Y and **Hemmati S**. TAT-mediated intracellular delivery of carboxypeptidase G2 protects against methotrexate-induced cell death in HepG2 cells. *Toxicology and Applied Pharmacology*, 2018, 346: 9-18
- 2) Owji H, Hajiebrahimi A, Seradj H and **Hemmati S**. Identification and functional prediction of stress responsive AP2/ERF transcription factors in *Brassica napus* by genome-wide analysis. *Computational Biology and Chemistry*, 2017, 71: 32-56
- 3) Hajiebrahimi A, Owji H and **Hemmati S**. Genome-wide identification, functional prediction and evolutionary analysis of R2R3-MYB superfamily in *Brassica napus*. *Genome*, 2017, 60(10): 797-814
- 4) **Hemmati S**. Physiological roles of aquaporins in the improvement of plant water and nutrient usage. *Research & Reviews in Biosciences*, 2017, 12(3):133
- 5) **Hemmati S**, Seradj H and Mehrabi N. Characterization of the lignin polymer in Brassicaceae family. *Research Journal of Pharmacognosy*, 2017, 4(2): 1-13
- 6) **Hemmati S**. Analysis of the expression level of aquaporins under acetylene treatment and pathogen attack. *Trends in Pharmaceutical Sciences*, 2017, 3(2):71-82
- 7) Rahmatabadi S, Sadeghian I, Nezafat N, Negahdaripour M, Hajighahramani N, **Hemmati S** and Ghasemi Y. *In silico* investigation of pullulanase enzymes from various Bacillus species. *Current Proteomics*, 2017, 14(3): 175-185
- 8) Asnafi R and **Hemmati S**. Screening *Salvia macrosiphon* transcriptome for 4-coumarate CoA ligase enzyme coding genes. *Trends in Pharmaceutical Sciences*, 2016, 2(5):205-218
- 9) **Hemmati S** and Seradj H. Justicidin B: A promising bioactive lignan. *Molecules*, 2016, 21(7): 820

- 10) **Hemmati S.** Predicting the functionality of major intrinsic proteins: An *in silico* analysis in *Musa*. Trends in Pharmaceutical Sciences, 2016, 2(2):139-150
- 11) Raisnejadian H, Ebrahimi S, **Hemmati S.** Ethical challenges in the community pharmacy setting from the perspective of faculty members of Shiraz School of Pharmacy and pharmacy practitioners: a qualitative study. Iranian Journal of Medical Ethics and History of Medicin, 2016, 8(5): 77-93
- 12) Dabbagh F, Ghoshoon MB, **Hemmati S,** Zamani M, Mohkam M, Ghasemi Y. Engineering Human Urate Oxidase: Towards Reactivating It as an Important Therapeutic Enzyme. Current Pharmaceutical Biotechnology, 2016, 17(2): 141-146
- 13) **Hemmati S.** Phenylalanine ammonia-lyase through evolution: A bioinformatic approach. Trends in Pharmaceutical Sciences, 2015, 1(1):10-14
- 14) Ghoshoon MB, Berenjjan A, **Hemmati S,** Dabbagh F, Karimi Z, Negahdaripour M, Ghasemi Y. Extracellular Production of Recombinant L-Asparaginase II in Escherichia coli: Medium Optimization Using Response Surface Methodology. International Journal of Peptide Research and Therapeutics, 2015, 21(4): 487-495
- 15) Zamani M, Berenjjan A, **Hemmati S,** Nezafat N, Ghoshoon MB, Dabbagh F, Mohkam M, Ghasemi Y. Cloning, Expression, and Purification of a Synthetic Human Growth Hormone in Escherichia coli Using Response Surface Methodology. Molecular Biotechnology, 2015, 57(3): 241-250
- 16) Karimi Z, Nezafat N, Negahdaripour M, Berenjjan A, **Hemmati S,** Ghasemi Y. The effect of rare codons following the ATG starts codon on expression of human granulocyte colony stimulating factor in Escherichia coli. Protein Expression and Purification, 2015, 114: 108-114.
- 17) Farhadi T, Nezafat N, Ghasemi Y, Karimi Z, **Hemmati S,** Erfani N. Designing of complex multi-epitope peptide vaccine based on Omps of Klebsiella pneumoniae: An *in silico* approach. International Journal of Peptide Research and Therapeutics. 2015, 21(3): 325–341.

- 18) Farhadi T, Karimi Z, Ghasemi Y , Nezafat N, **Hemmati S**, Erfani N. Production of a novel multi-epitope vaccine based on outer membrane proteins of *Klebsiella pneumoniae*. *Trends in Pharmaceutical Sciences*.2015, 1(3): 167-172.
- 19) Mobasher A, Ghasemi Y, Montazeri-Najafabady N, Ghasemian A, Rasoul Amini S, **Hemmati S**, Ebrahimi S. Two step production of optimizedinterferon beta 1b; A way to overcome its toxicity. *Journal of pure and Applied Microbiology*.2014, 7(4):2867-2871.
- 20) **Hemmati S**, von Heimendahl CBI, Klaes M., Alfermann AW, Schmidt TJ, Fuss E. Pinoresinol-lariciresinol reductases with opposite enantiospecificity determine the enantiomeric composition of lignans in the different organs of *Linum usitatissimum* L. *Planta Medica*, 2010, 76 (9): 928-934.
- 21) Schmidt TJ, **Hemmati S**, Klaes M, Konuklugil B, Mohagheghzadeh A, Ionkova I, Fuss E,Alfermann AW. Lignans in flowering aerial parts of *Linum* species- Chemodiversity in the light of systematic and phylogeny. *Phytochemistry*, 2010, 71 (14-15): 1714-1728
- 22) Mohagheghzadeh A, Dehshahri S, **Hemmati S**. Accumulation of lignans by three *in vitro* cultures of *Linum* species. *Zeitschrift für Naturforschung-Section C-A Journal of Biosciences*, 2009, 64 (1-2): 73-76
- 23) **Hemmati S**, Schneider B, Schmidt TJ, Federolf K, Alfermann AW, Fuss E. Biosynthesis of justicidin B and diphyllin in cell cultures of *Linum perenne*L. *Himmelszelt. Planta Medica*, 2008, 74 (9): 1168
- 24) Mohagheghzadeh A, Gholami A, **Hemmati S**,Dehshahri S. Bag culture: A method for root-root co-culture. *Zeitschrift für Naturforschung-Section C-A Journal of Biosciences*, 2008, 63 (1-2): 157-160
- 25) **Hemmati S**, Schneider B, Schmidt TJ, Federolf K, Alfermann AW, Fuss E. Justicidin B 7-hydroxylase, a cytochrome P450 monooxygenase from cell cultures of *Linum perenne* Himmelszelt involved in the biosynthesis of diphyllin. *Phytochemistry*, 2007, 68 (22-24): 2736-2743
- 26) **Hemmati S**, Schmidt TJ, Fuss E. (+)-pinoresinol/(-)-lariciresinol reductase from *Linum perenne* Himmelszelt involved in the biosynthesis of justicidin B. *FEBS Letters*, 2007, 581 (4): 603-610

- 27) Mohagheghzadeh A, Gholami A, **Hemmati S**, Ardakani MRS, Schmidt TJ, Alfermann AW. Root cultures of *Linum* species section *Syllinum* as rich sources of 6-methoxypodophyllotoxin. *Zeitschrift für Naturforschung-Section C-A Journal of Biosciences*, 2007, 62 (1-2): 43-49
- 28) Schmidt TJ, **Hemmati S**, Fuss E, Alfermann AW. A combined HPLC-UV and HPLC-MS method for the identification of lignans and its application to the lignans of *Linum usitatissimum* L and *L. bienne* Mill. *Phytochemical Analysis*, 2006, 17 (5): 299-311
- 29) Mohagheghzadeh A, **Hemmati S**, Alfermann AW. Quantification of aryltetralin lignans in *Linum album* organs and in vitro cultures. *Iranian Journal of Pharmaceutical Sciences*, 2006, 2 (1): 47-56
- 30) Ardakani MS, **Hemmati S**, Mohagheghzadeh A. Effect of elicitors on the enhancement of podophyllotoxin biosynthesis in suspension cultures of *Linum album*. *DARU*, 2005, 13 (2): 56-60
- 31) Mohagheghzadeh A, Gholami A, Soltani M, **Hemmati S**, Alfermann AW. *Linum mucronatum* sp. *mucronatum*: organ to organ lignan variation. *Zeitschrift für Naturforschung-Section C-A Journal of Biosciences*, 2005, 60 (5-6): 508-510
- 32) Mohagheghzadeh A, **Hemmati S**, Mehregan I, Alfermann AW. *Linum persicum*: Lignans and placement in Linaceae. *Phytochemistry Reviews*, 2003, 2 (3): 363-369

Ph.D. Dissertation:

Biosynthesis of lignans in plant species of section *Linum*: pinoresinol-lariciresinol reductase and justicidin B 7-hydroxylase. (Heinrich Heine University, Dusseldorf, Germany)

Pharm. D. Dissertation:

Establishment of in vitro cultures of *Linum album* and screening for high lignan producing lines. (Shiraz University of Medical Sciences, Shiraz, Iran)

Abstracts and Congress Presentations:

Hemmati S. *In silico* genome wide analysis of aquaporins in *Musa acuminata*. The 7th Congress on Bioinformatics, Tehran, Iran, January 2018

Owji H, **Hemmati S**. Alumina nanoparticle interaction with hairy roots of *L. persicum*. Asian Nano Forum Conference, Kish Island, Iran, March 2015.

Owji H, **Hemmati S**. Effect of nanoparticles on transgenic plant cells. IPSS, Tabriz, Iran, October 2014.

Owji H, **Hemmati S**. Elucidation of the biosynthetic pathway of phytoestrogen like molecules by Arabidopsis genome mining. IPSS, Kermanshah, Iran, October 2013.

Alipour M, **Hemmati S**. Biosynthesis of phytoestrogens in *Punica* sp. IPSS, Kermanshah, Iran, October 2013.

Zandian S, **Hemmati S**. Effect of elicitors on the biosynthesis of lignans in *Linum persicum*. IPSS, Kermanshah, Iran, October 2013.

Hemmati S. Enantiospecific enzymes responsible for the formation of phytoestrogens in flax. In: Iranian Pharmaceutical Science Congress, Isfahan, Iran, September 3-6, 2012.

Hemmati S, Chapple C. A cytochrome P450 from the CYP81 family is required for the N-hydroxylation of indole glucosinolates in *Arabidopsis thaliana* roots. In: Biochemistry Retreat, Purdue University, Indiana, USA, October 2010.

Hemmati S, Chapple C. Reconstitution of the entry point of Arabidopsis phenylpropanoid metabolism with a bacterial tyrosine ammonia-lyase. In: Gordon Research Conferences (Plant Metabolic Engineering), Waterville valley, New Hampshire, USA, July 12-17, 2009.

Hemmati S, Chapple C. Identification of cytochrome P450 monooxygenases acting against phenylpropanoid intermediates in *Arabidopsis thaliana*. In: Biochemistry Retreat, Brookston, Indiana, USA, October 13, 2008.

Hemmati S, Fuss E. (+)-pinoresinol/(-)-lariciresinol reductase from *Linum perenne* Himmelszelt involved in the biosynthesis of justicidin B. In: 50 Years of the Phytochemical Society of Europe, Cambridge, UK, April 11-14, 2007.

Hemmati S, Schmidt TJ, Alfermann AW. Evolution and diversity of lignan biosynthesis in the genus *Linum*. In: 5th Kurt-Mothes-Doktoranden-Workshop, Halle, Germany, October 5-7, 2005.

Hemmati S, Fuss E. Pinoresinol lariciresinol reductase in justicidin B producing cell cultures of *Linum perenne*. In: XVII International Botanical Congress, Vienna, Austria, July 17-23, 2005.

Hemmati S. Lignans in *Linum perenne*. In: Sektion Pflanzliche Naturstoffe der Deutschen Botanischen Gesellschaft, Kaub am Rhein, Germany, March 16-18, 2005.

Hemmati S, Schmidt TJ, Alfermann AW, Fuss E. Chemodiversity of lignan accumulation in the genus *Linum*. In: Botanikertagung, Braunschweig, Germany, September 5-10, 2004.

Hemmati S. Reductases in *Linum* species. In: Workshop der Graduierten Kollegs Molekular Physiologie, Debringhausen, Germany, June 25-27, 2004.

Hemmati S, Alfermann AW, Fuss E. Diversity of lignans in *Linum* species. In: Future trends in phytochemistry, Gargnano, Italy, May 5-8, 2004.

Hemmati S, Mohagheghzadeh A, Alfermann AW. Quantification of aryltetralin lignans in plant parts and ontogenic stages of *Linum album*. In: Phytochemistry and biology of lignans, Bornheim-Walberberg, Germany, April 6-9, 2003.

Hemmati S, Mohagheghzadeh A, Alfermann AW. *In vitro* cultures of *Linum album* and screening for high lignan producing lines. In: Future trends in phytochemistry, Gargnano, Italy, May 22-25, 2002.

Honors and Awards:

Distinguished Assistant Professor, Shiraz University of Medical Sciences, May 2015, Shiraz, Iran.

Postdoc. scholarship from “The Global Climate and Energy Project” (led by Stanford University), Department of Biochemistry, Purdue University, West Lafayette IN, USA.

Ph. D. scholarship from “Gesellschaft von Freunden und Förderern der Heinrich-Heine Universität Düsseldorf (Duesseldorf Entrepreneurs Foundation), Duesseldorf, Germany.

First prize winner from the president (Outstanding pharmacy student-2002).

Technical Skills:

Gateway cloning technology, Western blot analysis, Plant Cell, tissue and organ culture and basic molecular biology techniques such as PCR, electrophoresis, etc. Gene silencing via RNAi, transformation by binary vectors, genomic southern analysis, floral dip transformation, genotyping T-DNA knock out lines. *In silico* genome wide analysis. Analysis of plant cell wall polymers. Experience in chromatography and spectroscopy techniques: LC-MS, HPLC, Column and chiral chromatography, UV-VIS.

Teaching Assignments:

Molecular Biology and Genetic Engineering, Protein chemistry, Bioinformatics, Cell culture, Instrumental analysis (Ph D students).

Pharmaceutical Biotechnology, Molecular Biology, Biologicals, Pharmacognosy, Plant Cell, Tissue and Organ Culture (Pharm D students).