

## **Rania Hamed**

Faculty of Pharmacy  
Al-Zaytoonah University of Jordan  
Amman-Jordan

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### **EDUCATION**

- 2005-2011: Ph.D. Pharmacy (Pharmaceutics)  
The University of Iowa-Division of Pharmaceutics and Translational Therapeutics  
Overall GPA: 3.71/4.00  
Dissertation: Development of a physiologically relevant *in vitro* model system to study exhaled bioaerosols
- 2004-2005: Graduate student  
The University of Louisiana-Division of Pharmaceutics  
Overall GPA: 3.89/4.00
- 2002-2004: M.A. Clinical Chemistry  
The University of Scranton-Chemistry Department  
Overall GPA: 3.88/4.00  
Dissertation: Permeation enhancers of Indomethacin using Franz diffusion cell technique
- 1988-1993: B.S. Pharmacy  
Jordan University of Science & Technology  
Overall GPA: 3.44/4.00

### **PROFESSIONAL EXPERIENCE**

- July (2017)-Present **Associate Professor**, Faculty of Pharmacy, Al-Zaytoonah University of Jordan, Amman-Jordan
- Sep (2013)-Sep (2017) **Head of the Pharmacy**, Faculty of Pharmacy, Al-Zaytoonah University of Jordan, Amman-Jordan
- Sep (2011) -Sep (2013) **Assistant Professor**, Faculty of Pharmacy, Al-Zaytoonah University of Jordan, Amman-Jordan
- 1999-2002 **Director of the Quality Control Department**, Jordan Veterinary and Agricultural Medicinal Industries (JOVET), Amman-Jordan
- 1996-1999 **Director of the Research and Development**, Jordan Veterinary and Agricultural Medicinal Industries (JOVET), Amman-Jordan
- 1993-1996 **Senior Scientist**, RAM Pharmaceutical Industries, Amman-Jordan

### **RESEARCH EXPERIENCE**

- 2011-Present **Associate Professor**, Faculty of Pharmacy, Al-Zaytoonah University of Jordan
- Current research:

- Development of controlled-release solid dosage forms based on hydrophilic and hydrophobic polymeric matrix systems.
  - Determining the key parameters of the physiologically-relevant dissolution media that control the rate of dissolution of BCS class II drugs along the GI tract to better predict their *in vivo* performance.
  - Nanoemulsion-based gel formulation as a carrier system for topical drug delivery.
  - Mechanical characterization of matrix-forming polymers.
- Aug 1<sup>st</sup>- 31<sup>st</sup>, 2017      **Visiting Faculty Researcher** (Exchange Visitor), College of Pharmacy and Pharmaceutical Sciences, Department of Pharmacy Practice, The University of Toledo  
Professor Sai HS. Boddu  
Research: 1) Development and characterization of Tanshinone IIA microparticles for sustained therapy in age related macular degeneration.  
2) Transdermal drug delivery  
Invited presentation: Stability of Active Pharmaceutical Ingredients and Finished Pharmaceutical Products, Graduate School, College of Pharmacy and Pharmaceutical Sciences, The University of Toledo.
- Aug-Sep 2016      **Visiting Research Fellow**, School of Pharmacy, The University of Manchester.  
Professor Harmesh Aujola  
Research: Bovine serum albumin-loaded nanoemulsion using spontaneous emulsification: A potential drug delivery system for protein therapeutics.
- Aug-Sep 2015      **Visiting Research Fellow**, School of Pharmacy, Queen's University Belfast  
Professor David Jones  
Research: Development and optimization of oleogels for controlled drug delivery
- 2005-2011      **Graduate Research Assistant**, Advisor: Dr. Jennifer Fiegel  
Division of Pharmaceutics and Translational Therapeutics, The University of Iowa  
  
Research: Develop a more physiologically relevant *in-vitro* model mimetic of tracheal mucus to study the surface rheology of tracheal mucus and elucidate the mechanism of bioaerosol formation
- Matched the chemical composition, component concentrations, and physicochemical properties (i.e. surface tension and bulk rheology) of the *in-vitro* model mimetic to native tracheal mucus
  - Probed the surface rheology of surfactants adsorbed at the air-mucus interface
  - Elucidated key parameters that control the size distribution of bioaerosols generated from tracheal mucus tract by utilizing an enhanced simulated cough machine
- 2003-2004      **Graduate Research Assistant**, Advisor: Dr. John Deak  
Chemistry Department, The University of Scranton  
  
Research: Permeation enhancers for indomethacin using Franz diffusion cell technique
- Determined conditions for *in-vitro* permeation test using Franz diffusion cell technique
  - Evaluated silicones as new permeation enhancers
  - Differentiated indomethacin permeability through skin obtained from different species
- 2003      **Aventis Scholarship Recipient**  
Process Development Department, Aventis Pasteur, Swiftwater, PA
- Determined polysaccharide content using specific assays for phosphorus and sialic acid

- Determined protein content using Lowry's method
- Size exclusion and hydrophobic interaction chromatography techniques to further characterize polysaccharide/protein conjugate vaccine candidates

### PUBLICATIONS

1. S. Sunoqrot, A. Alsadi, O. Tarawneh, **R. Hamed**. Polymer type and molecular weight dictate the encapsulation efficiency and release of Quercetin from polymeric micelles. *Colloid Polym Sci.* 2017 Oct; 295(10): 2051-2059.
2. S. Sunoqrot, L. Hasan, A. Alsadi, **R. Hamed**, O. Tarawneh. Interactions of mussel-inspired polymeric nanoparticles with gastric mucin: Implications for gastro-retentive drug delivery. *Colloids Surf B Biointerfaces.* 2017 Aug; 156: 1–8.
3. **R. Hamed**, R. AlJanabi, S. Sunoqrot, A. Abbas. The effect of pH, buffer capacity, and ionic strength on quetiapine fumarate release from matrix tablets prepared using two different polymeric blends. *Drug Dev Ind Pharm.* 2017 Aug; 43(8): 1330-1342.
4. **R. Hamed**, A. Al-Samydai, T. Al Baraghthi, O. Tarawneh, S. Sunoqrot. Influence of HPMC K100LV and Compritol® HD5 ATO on drug release and rheological behavior of HPMC K4M matrix tablets. *J Pharm Innov.* 2017 March; 12: 62-75.
5. S. Sunoqrot, **R. Hamed**, Abdel-Halim H, O. Tarawneh. Synergistic interplay of medicinal chemistry and formulation strategies in nanotechnology—From drug discovery to nanocarrier design and development. *Curr Top Med Chem.* 2017; 17(3): 1451-1468.
6. **R. Hamed**, T. Al Baraghthi, S. Sunoqrot. Correlation between the viscoelastic properties of the gel layer of swollen HPMC matrix tablets and their in vitro drug release. *Pharm Dev Technol.* 2016 Nov; 21: 1-11.
7. **R. Hamed**, T. Al Baraghthi, A. Zaid Alkilani, R. Abu-Huwajj. Correlation between Rheological Properties and *In Vitro* Drug Release from Penetration Enhancers-Loaded Carbopol® Gels. *J Pharm Innov.* 2016 Dec; 11(4): 339-351.
8. **R. Hamed**, A. Awadallah, S. Sunoqrot, O. Tarawneh, S. Nazzal, T. AlBaraghthi, J. Al Sayyad, A. Abbas. pH-dependent solubility and dissolution behavior of carvedilol-case example of a weakly basic BCS class II drug. *AAPS PharmSciTech.* 2016 Apr; 17(2): 418-426.
9. **R. Hamed**, M. Basil, T. AlBaraghthi, S. Sunoqrot, and O. Tarawneh. Nanoemulsion-based gel formulation of diclofenac diethylamine: design, optimization, rheological behavior and in vitro diffusion studies. *Pharm Dev Technol.* 2016 Dec; 21(8):980-989.
10. **R. Hamed**, J. Fiegel. Synthetic Tracheal Mucus with Native Rheological and Surface Tension Properties. *J. Biomed. Mater. Res. A.* 2014 Jun; 102(6):1788-1798.
11. T. Brenza, **R. Hamed**, and J. Fiegel. Controlled transport for pulmonary drug delivery. In: H. Smyth and A. Hickey (eds.) *Controlled Release Science and Technology: Pulmonary Delivery.* New York: Springer. 2011. [Book Chapter]

### PUBLISHED ABSTRACTS AND PROCEEDINGS

1. **R. Hamed**, A. Aburezeq. Development and optimization of oleogels and bigels as topical drug delivery systems for periodontitis. 6<sup>th</sup> FIP Pharmaceutical Sciences World Congress, Stockholm, Sweden, May 2017.
2. **R. Hamed**, R. AlJanabi, A. Abbas, S Sunoqrot. The effect of the physiological parameters of the gastrointestinal fluid on quetiapine fumarate release from matrix tablets prepared using two different polymeric blends. 6<sup>th</sup> FIP Pharmaceutical Sciences World Congress, Stockholm, Sweden, May 2017.
3. A. Abu Rezzq, **R. Hamed**, O. Tarawneh. Development and optimization of hydrogels, oleogels, and bigels as topical drug delivery systems for periodontitis. ASU-Pharmacy Third Conference, Amman, Jordan, Apr 2017.
4. **R. Hamed**. A novel approach to determine the rheological properties of the gel layer of swollen hydrophilic matrix tablets. 8th International Conference and Exhibition on Pharmaceutics & Novel Drug Delivery Systems, Madrid, Spain, March 2016.
5. **R. Hamed**. Simulating the surface tension of the gastrointestinal fluid to enhance the dissolution of the weakly basic BCS class II drugs. 8th International Conference and Exhibition on Pharmaceutics & Novel Drug Delivery Systems, Madrid, Spain, March 2016.

6. R. AlJanabi & **R. Hamed**. The influence of the chemical properties of the dissolution medium on the rate of quetiapine fumarate release from HPMC and Compritol® HD5 ATO matrix tablets. Applied Science University Second Symposium, Amman, December 2015.
7. R. AlJanabi & **R. Hamed**. The effect of pH and ionic strength of the dissolution media on the rate of Quetiapine Fumarate release from polymeric matrix tablets. *Al-Zytoonah University of Jordan and University of Toledo (ZTIPC 2015)*, Amman, October 2015.
8. **R. Hamed**. Comparative rheological studies of diclofenac diethylamine conventional gel, emulgel, and a nanoemulsion-based gel formulation. *American Association of Pharmaceutical Scientists (AAPS)*, San Diego, CA, 2014.
9. **R. Hamed**, Lina Hammad, Aiman Abbas. The effect of polymer type, ratio, and viscosity grade on the in vitro release of quetiapine fumarate, a BCS class II drug, from controlled release matrix tablets. *American Association of Pharmaceutical Scientists (AAPS)*, San Diego, CA, 2014.
10. **R. Hamed**, J. Fiegel. Surface rheological properties of surfactants adsorbed at an air-mucus interface. *International Pharmaceutical Federation's PSWC and the American Association of Pharmaceutical Scientists (AAPS) Annual Meeting*, New Orleans, LA, 2010.
11. **R. Hamed**, J. Fiegel. Investigating the interfacial rheological properties of surfactants adsorbed at an air-mucus interface of the upper respiratory tract (URT). *James F. Jakobsen Graduate Conference, University of Iowa*, Iowa City, IA, 2010.
12. **R. Hamed**, J. Fiegel. Development of a more physiologically-relevant mucus mimetic of the upper respiratory tract. *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Nashville, TN, 2009.
13. **R. Hamed**, J. Fiegel. Evaluating the role of mucus physicochemical properties on bioaerosol formation in the lungs. *James F. Jakobsen Graduate Conference, University of Iowa*, Iowa City, IA, 2009.
14. **R. Hamed** & J. Fiegel. Investigating the properties of lung mucus: Toward understanding the role of mucus physicochemical properties in bioaerosol formation. *The International Society for Aerosols in Medicine*, Monterey, CA, 2009.
15. **R. Hamed**, J. Fiegel. Evaluating the role of mucus physicochemical properties on bioaerosol formation in the lungs. *Pharmaceutics Graduate Student Research Meeting*, Purdue University, IN, 2009.
16. **R. Hamed**, J. Fiegel. Determining key factors that control the formation of pathogenic bioaerosols within the upper respiratory system. *James F. Jakobsen Graduate Conference, University of Iowa*, Iowa City, IA, 2008.
17. **R. Hamed**, J. Fiegel. Bioaerosol formation from lung surfaces: Evaluating the role of mucus physicochemical properties. *American Association of Pharmaceutical Scientists (AAPS)*, Atlanta, GA, 2008.
18. **R. Hamed**, J. Fiegel. The role of mucus physicochemical properties in controlling bioaerosol formation within the upper respiratory tract. *Pharmaceutics Graduate Student Research Meeting*, University of Michigan, MI, 2008.
19. **R. Hamed**, J. Fiegel. Physiologically-relevant cough machine to study bioaerosol formation in the lungs. *American Association of Pharmaceutical Scientists (AAPS)*, San Diego, CA, 2007.

### **ORAL PRESENTATIONS**

1. **R. Hamed**. Investigation of the rheological properties of the gel layer of swollen HPMC matrix tablets to better predict their *in vitro* release. Al-Zytoonah University of Jordan and University of Toledo (ZTIPC 2015), Amman, October 2015.
2. **R. Hamed**. Comparative rheological studies of diclofenac diethylamine conventional gel, emulgel, and nanoemulsion-based gel. Al-Zytoonah University of Jordan, Amman, 2014.
3. **R. Hamed**, J. Fiegel. Development of a more physiologically-relevant mucus mimetic of the upper respiratory tract. *American Institute of Chemical Engineers (AIChE)*, Nashville, TN, 2009.

### **HONORS AND AWARDS**

- The Office of Research and Sponsored Programs at The University of Toledo, Visiting Faculty Researcher Program, Aug 1<sup>st</sup> – 31<sup>st</sup> 2017 (\$5,000).
- Daniel Turnberg Travel Fellowships, Visiting Research Fellow, School of Pharmacy, the University of Manchester, Aug 1<sup>st</sup> – Sep 10th 2016 (€3,500).

- Mobility grant funded by EU-JordanNet II European, Visiting Research Fellow, School of Pharmacy, Queen's University Belfast, Aug 9<sup>th</sup> – Sep 20<sup>th</sup> 2015 (€2,600).
- Division of Pharmaceutics and Translational Therapeutics Dissertation Fellowship, The University of Iowa-2010.
- Graduate College Summer Fellowship, The University of Iowa-2010.
- Executive Council of Graduate and Professional Student (ECGPS) Research Grant, The University of Iowa-2010.
- Division of Pharmaceutics and Translational Therapeutics Travel Award, The University of Iowa-2010, 2008 & 2007.
- Women in Science and Engineering Travel Award, The University of Iowa-2009.
- Executive Council of Graduate and Professional Student (ECGPS) Scholarly Presentation Award, The University of Iowa-2009.
- Graduate Student Senate Travel Fund Award, The University of Iowa-2008.
- Division of Pharmaceutics John L. Lach Memorial Scholarship, The University of Iowa-2007.
- American Association of Pharmaceutical Scientists (AAPS)-Travel Award 2007.

### **GRANT WRITING EXPERIENCE**

- Deanship of Scientific Research, Al-Zaytoonah University of Jordan  
Surface Properties of Nanoformulation Design for Transdermal Delivery Systems, Funded 2017 (32,935 JD)/Principle Investigator.
- Scientific Research Funds in Jordan  
The efficiency of using oleogels and bigels in treating periodontitis in an *in vitro* host-parasite interaction model, Funded 2017 (74,000 JD)/Co-Investigator.
- Deanship of Scientific Research, Al-Zaytoonah University of Jordan  
Nanoemulsion-based gel formulation for topical drug delivery systems, Funded 2013 (97,170 JD)/Principle Investigator.
- Executive Council of Graduate and Professional Student (ECGPS) Research Grant, The University of Iowa  
Investigating the effect of salts on the surface viscoelastic properties of the upper respiratory tract: Towards developing simple aerosols to halt airborne disease transmission, Funded 2010
- Pre-Doctoral Fellowship Program Grant, Parenteral Drug Association (PDA)  
Correlating mucus physicochemical properties to bioaerosol formation in the respiratory tract: Towards the development of new infectious disease control strategies, not funded

### **PROFESSIONAL MEMBERSHIPS**

- Member, Quality Assurance Committee, Al-Zaytoonah University of Jordan; 2015-2016.
- Technical consultant, Jordan Food and Drug Administration (JFDA), Amman, Jordan; 2012-2013
- Member, Abstracts and Posters Selection Committee, the 14<sup>th</sup> Jordan Pharmaceutical Conference, Jordan Pharmaceutical Association, Amman, Jordan; 2012
- American Association of Pharmaceutical Scientists
  - Chair of Student Chapter 2009-2010
  - Vice-chair of Student Chapter 2006-2009
- Women in Science and Engineering
- Jordan Pharmacists Association
- Phi Lambda Upsilon (Honory Chemical Society)
- Who's Who Among Students in American Universities and Colleges

**ATTENDED WORKSHOPS**

- ACPE certification workshop. The University of Jordan. Amman Oct 10<sup>th</sup>, 2017.
- Erasmus Plus information day. Amman Oct 9<sup>th</sup>, 2017.
- Management of Horizon 2020 projects- University External Relations. Amman Jan 16<sup>th</sup>, 2017.
- Proposal writing for H2020 EU funding opportunities. Support to research, technological development and innovation in Jordan (SRTD) – Phase II. Amman 5-7 Dec, 2016
- National brokerage event, transferring innovative science into business. Support to research, technological development and innovation in Jordan (SRTD) – Phase II. Amman, 23<sup>rd</sup> Nov, 2016.
- Quality assurance workshop (External reviewers and site visit for the academic program). *Al-Zaytoonah University of Jordan*. Amman, 2-4 Nov, 2013.

**COLLABORATIONS**

- Dr. Aiman Abbas, Hikma Pharmaceuticals; Amman-Jordan
- Dr. Sami Nazzal, University of Louisiana/Monroe; Louisiana-USA
- Dr. Ahlam Zaid Kilani, Zarqa University; Zarqa-Jordan
- Dr. Rana Abu Hwajj, Al-Ahliyya Amman University; Amman-Jordan
- Dr. Suhair Sunoqrot, Al-Zaytoonah University of Jordan; Amman-Jordan
- Dr. Nouf Mahmoud, Al-Zaytoonah University of Jordan; Amman-Jordan

**TEACHING**

- Pharmaceutics I: physical pharmacy (3 credit hours)
- Pharmaceutics II: routes of administration and pharmaceutical dosage forms (2 credit hours)
- Pharmacoeconomics (2 credit hours)
- Advanced pharmaceutical technology/Graduate level (2 credit hours)
- Biostatistics and applications/Graduate level (3 credit hours)
- Physical pharmacy laboratory (1 credit hour)
- Pharmaceutical calculations (1 credit hour)
- Practical industrial pharmacy laboratory II (1 credit hour)
- Pharmaceutics laboratory (1 credit hour)
- Pharmaceutical technology laboratory (1 credit hour)

**RESEARCH SUPERVISION****Research Assistants**

Arej Eissa (March 2016-Present)

**Research area:** Nanoemulsion formulations for poorly soluble drugs.

Tamadur Al-Baraghi (April, 2014-March 2016)

**Research Area:** 1) Development of controlled-release solid dosage forms based on hydrophilic and hydrophobic polymeric matrix systems, and 2) Nanoemulsion based gel formulation of Diclofenac Diethylamine. 3) Investigating the rheological properties of the gel layer of swollen HPMC matrix tablets to better predict their *in vitro* release.

Enaam Shahadeh (October, 2012-August, 2013)

**Research area:** Preparation and characterization of nanoemulsion.

**Graduate Students (Master's degree)**

Sabrina AlNadi (March 2017-present)

Research area: Dissolution behavior of the poorly soluble weak acid drug valsartan upon entry in the small intestine.

Ahmad Farhan (March 2017-present)

Research area: Nanoemulsion-based oleogel formulation of lidocaine for transdermal delivery

Ala'a Abu Rezq (Oct 2015-Jan 2017)

Research area: Development and optimization of hydrogel, oleogels and bigels as topical drug delivery systems for periodontitis.

Reem AlJanabi (Mar 2015-Mar 2016)

Research area: The effect of pH and ionic strength of the dissolution media on the rate of Quetiapine Fumarate release from polymeric matrix tablets.

Marwa Basel (Oct 2014-Sep 2015)

Research area: Development and optimization of diclofenac diethylamine nanoemulsion-based gel formulation.

Ali Al-Samydai (Oct 2014-May 2015)

Research area: The effect of polymer type, ratio, and viscosity grade on the *in vitro* release of quetiapine fumarate, a BCS class II drug, from a controlled release matrix tablets.

Areej Awadallah (Mar 2014-Dec 2014)

Research area: Determining the key parameters of the physiologically relevant dissolution media that control the rate of dissolution of BCS class II drugs along the GI tract to better predict the *in vivo* performance.

#### **DISSERTATION/THESIS COMMITTEE MEMBERSHIP**

##### ***External Member on M.S Defense Committee***

Tamara Athamneh (Pharmaceutics; Supervising Professor: Bassam Tashtoush)

Faculty of Pharmacy, Jordan University of Science and Technology

Thesis title: Preparation and evaluation of Levodopa- $\beta$ -cyclodextrin patches for transdermal delivery, defense: June, 2014.