CURRICULUM VITÆ

RODOLFO PINAL, Ph.D.

Purdue University
Department of Industrial and Physical Pharmacy
575 Stadium Mall Drive
West Lafayette, IN 47907
+1-765-496-6247
rpinal@purdue.edu

EXPERIENCE:

2009-Present	Associate Professor
2003-2009	Assistant Professor
Department of Industrial and Physical Pharmacy Purdue University	

Research:

Leading and conducting graduate level research in the study of some of the most prevalent problems encountered during pharmaceutical product development, such as solubility, solubilization and drug delivery, from the theoretical framework provided by the properties of liquid (fluid and amorphous) mixtures. Drug-polymer and drug-lipid mixtures as systems for improved solubility, dissolution and drug delivery are among current research projects.

Solubility, solubilization and drug delivery of liquid mixtures and amorphous systems

- Methods for enhancing oral bioavailability of poorly soluble active compounds
- Relationship between chemical structure and physical properties responsible for the solubility of drugs
- Development of amorphous formulations with improved drug solubility
- Stabilization of amorphous formulations through the study, modeling and control of molecular mobility

Study of polymeric excipients and their interactions in pharmaceutical systems

- Investigation of the effect of polymer-plasticizer interactions on the mechanical and mass transport properties of pharmaceutical polymers
- Dispersions of drug microparticles in polymeric films as drug delivery systems
- Production of spatially dispersed, stable nanocrystals for delivery of highly insoluble anticancer drugs via transcytosis
- Development of polymeric strip films containing immobilized, spatially disperse API micro- and nano-particles

Pharmaceutical Processing

- Influence of excipient raw material physical properties on the quality attributes products made by roller compaction
- Use of acoustic emission for the continuous monitoring and control of pharmaceutical manufacturing processes
- Matrix assisted co-crystallization (MAC). Use of hot-melt extrusion for the production of formulated co-crystals in a scalable/continuous process

Hopewell EX1081
Hopewell v. Merck
IPR2023-00481

Prefabricated (modular) dosage forms

- Guide the development of a new technology for the design and manufacture of pharmaceutical dosage forms
- Research and development on working parts based on desired function (ID/anti-counterfeiting, solubilization, crystallization inhibition, chemical stabilization, etc.)
- Blueprint design and 3D assembly of integrated dosage forms prototypes
- Comparative performance testing against commercial benchmark products

International Activities:

2013- Present. Visiting Professor, Shenyang Pharmaceutical University, Shenyang, China

- Teach general aspects of pharmaceutics and physical characterization of solids to graduate and undergraduate students
- Teach theoretical and formulation aspects of solubility and solubilization of drugs
- Cover physical characterization of pharmaceutical solids in training courses designed for industrial scientists working in the Chinese pharmaceutical industry
- Serve as co-advisor of Masters' and Ph.D. students in the department of Pharmaceutics

2014 – Summer Faculty on Pharmaceutical Technology, Universidad de Los Andes, Bogota, Colombia.

- Solubility, solubilization and drug release from liquid mixtures and amorphous systems.

2015 - Present. Graduate thesis evaluation committee. Faculty of Pharmacy. Universidad Nacional de Colombia, Bogota, Colombia.

- Serve in graduate examination committee and thesis oral defense

Teaching:

Teaching of undergraduate and graduate level courses on Pharmaceutics, Pharmaceutical Technology and Drug Delivery.

Code	Course	Role
IPPH 100	Pharmaceutical Science Orientation	Instructor
IPPH 471	Parenteral Products	Instructor
IPPH 562	Manufacturing Processes	Instructor
IPPH 587	Pharmaceutical Solids	Instructor
IPPH 521	Drug Development	Instructor
IPPH 690A	Solids Discussion Group	Instructor
PHAD 690	Introduction to Pharmaceutical Sciences Research	Instructor
IPPH 590	Applied Thermodynamics	Instructor
PHRM 828	Dosage Forms I	Instructor
PHRM 829	Dosage Forms II	Instructor
PHRM 866	Biotechnology and Advanced Parenteral Products	Instructor
AGRY 544	Environmental Organic Chemistry	Instructor

Code	Course	Role
ABE 591	Microparticulate Systems, Surface Properties & Performance	Instructor

Administration:

- Director of Graduate Studies. Academic advisor to new graduate students. Develop development program of individual graduate students in preparation to join a research group/advisor. Review and revise the Graduate Studies handbook for the department. 2016 – Present.
- Undergraduate Curriculum Council 2019 - Present
- Chair, Graduate Admissions Committee, Industrial and Physical Pharmacy. Evaluate application materials for students wanting to pursue a Ph.D. degree in the department. Conduct one-to-one interviews with applicants. Assess applicants' scientific and academic qualifications for admission to the department. Vote on admission/non admission of student applicants. 2006 - 2016.
- Director, NSF-I/UCRC Purdue Dane O. Kildsig Center for Pharmaceutical Processing Research (CPPR). 2005 – 2018 - Present.
- Director, NSF-I/UCRC Dane O. Kildsig Center for Pharmaceutical Processing Research (CPPR). 2005 – 2018.
- Associate Director, Center for Pharmaceutical Processing Research (CPPR). 2004.
- Chair, Faculty Search Committee, Endowed Professorship, Department of Industrial and Physical Pharmacy. 2010.
- Assessment Committee, College of Pharmacy. 2010 – Present
- Graduate Fellowships Committee, 2004 – Present
- Faculty Council, 2012-2014
- SWOT (strengths, weaknesses, opportunities and threats) Analysis Task Force, 2014-2015
- University Grievances Committee, 2015 – 2018
- Professional Outcomes Task Force, 2015
- University Advisory Committee on Equity, 2017 – Present
- PharmD Program Admissions committee, chair 2022
- PharmD Program Admissions committee, 2022 – Present

Theses directed:

Chen Mao, Ph.D. 2006. Structural relaxation and molecular mobility in organic amorphous pharmaceutical compounds. Purdue University.

Fabrice Gusching, M.S. 2006. Antiplasticization of pharmaceutical polymers (Antiplasticisation des polymères à usage pharmaceutique), Univesité Louis Pasteur, Strasbourg, France. Co-advisor.

François-Xavier Diringer, M.S. 2007. Influence of moisture on the ability of microcrystalline cellulose to form tablets. Univesité Louis Pasteur, Strasbourg, France. Co-advisor.

Sai Prasanth Chamarthy, Ph.D. 2007. The different roles of suface and bulk effects on the functionality of pharmaceutical materials. Purdue University.

Carole Bucher, M.S. 2008. Assessment of the distribution of API microparticles in polymeric films. Univesité Louis Pasteur, Strasbourg, France. Co-advisor.

Michelle K. Papp, Ph.D. 2009. Application of acoustic emission to the monitoring of pharmaceutical unit operations. Purdue University

Nathan A. Boersen, Ph.D. 2009. The development of roller compacted formulations using multivariate and dimensional analysis. Purdue University.

Ji-Young Kim, Ph.D. 2009. Hydrotropic solubilization of poorly soluble drugs. Purdue University.

Maria Elisa Luque. M.S. 2010. Toward the development of an ontological framework for drug-loaded film manufacture. Dept. of Chemical Engineering. Co-advisor.

Ryan J. McCann. PhD. 2011. Investigating the density distribution of roller compacted ribbons. Purdue University.

Andrew Otte, Ph.D 2011. From milling to particle engineering: formulations for dry powder inhalers.

Xin Chen. PhD 2012. Solubility estimation and rapid structural characterization of small molecule drugs in polymers. Purdue University. Co-advisor.

Bo Zhou. PhD 2012. Development of laminate based, prefabricated dosage forms – Formulation, processing and characterization. Purdue University.

Yan Zhang. Ph.D. 2012. Kinetic driving effects of phase transformations in mechanically activated powders. Purdue University.

Kevin Boksa. PhD. 2014. Matrix-assisted cocrystallization: the simultaneous production and formulation of pharmaceutical cocrystals using melt extrusion. Purdue University.

Yang Song. Ph.D. 2015. Acid-base interactions in amorphous solid dispersions: Formulation strategy for tyrosine kinase inhibitors. Purdue University. Co-Advisor.

Jing Ling. Ph.D. 2017. Crystallization control using fabricated polymeric materials. Purdue University.

Hwee Jing Ong. Ph.D. 2018. Drug solubilization by means of a surface-modified biopolymer enabled by hot melt extrusion. Purdue University.

Mario Cano-Vega. 2019. Ph.D. Quality by Design approach to develop 3D Integrated Pharmaceuticals for personalized medicine. Purdue University. Co-Advisor.

1999-2003	**Research Leader (Solid-State Pharmaceutics)**
1997-1999	**Principal Scientist (Solid-State Pharmaceutics)**
Pharm. and Anal. R&D	
Hoffmann-La Roche	

Physical characterization of solids and Particle Technology. Supervisory responsibility for the group's activities and capabilities: X-ray powder diffraction, DSC and hot stage microscopy, TGA/IR, SEM, Image Analysis, particle size by Laser diffraction and Dynamic Light Scattering, Hygroscopicity (microbalance), Microcalorimetry (TAM), BET gas adsorption and gas pycnometry.

Responsible for identifying and devising methods for the measurement and monitoring of physical properties/parameters critical for the development of a given specific product or process. Responsibilities include the physical characterization of active ingredients, final dosage forms and intermediate blends. Work with formulation and process development scientists in troubleshooting powder technology issues of processability such as flowability, granulation and dissolution during development and technology transfer.

Leader of the Integrated Solid-State Strategy Team among international development centers for various projects. Designed and instituted methodology necessary for evaluating the physical attributes and stability for an amorphous formulation technology used in clinical trials. Work with Chemical Synthesis designing and implementing crystal polymorph screening strategy for new chemical entities during preclinical development and Kilo-lab production. Responsible for writing the IND and NDA sections on crystal polymorphism.
Provide official characterization data to Analytical groups on drug substances and formulations for GLP and cGMP qualification. Responsible for the regulatory compliance of the Solid State Pharmaceutics laboratory. Responsible for the development and validation of physical testing methods for regulatory submission and transfer to Quality Management for testing during production. Responsible, in the capacity of System Owner, for the Computer System Validation plan and implementation as dictated by 21CFR Part 11 for

instrumentation in the Solid State Pharmaceutics Laboratory. Technical Team Leader for preclinical activities (CMC section) of international project. Coordinate activities among scientists in the U.S., Germany and Switzerland, integrating Discovery Pharmacology, chemical supply, formulation and manufacturing, Toxicology and Pharmacokinetics.

1993-1997 **Pharmaceutical R&D** **Hoffmann-La Roche**	**Principal Scientist** **Sterile Dosage Forms**

Developed injectable formulations for Phase 00 and Phase 0 studies. Worked in the solubilization and formulation of organic molecules to support Drug Discovery, early Toxicology and Pharmacokinetics. Setup the capability for injectable emulsion technology in the group to support proof-of-concept efforts in Discovery.

Specific assignments: Parenteral development team leader for a polypeptide molecule in Phase II/III. Formulation research and GLP manufacture, compatibility testing with manufacturing process/materials. Formulation development and manufacture of IND-enabling stability lots, issue Directions for Manufacture of cGMP clinical supplies and complete transfer of the manufacturing process for clinical supplies to the manufacturing department. Coordinate clinical supply manufacturing and analytical (stability, release, and cleaning assessment) activities with CMC leader for regulatory submissions and shipment to the clinic.
Formulation scientist responsible for small molecule, line extension product. Manufacture of ANDA-enabling stability lots. Primary container selection studies, stopper extractables, tubing and filter membrane compatibility studies. Development of a manufacturing process suitable for trade lots. Preparation of Research Directions for technology transfer, scale-up and manufacture of exhibit lots.
International Team Leader for project focused on the identification and evaluation of new technologies for drug delivery and drug development.

1991-1993 **1990-1991** **Pharmaceutical R&D** **Hoffmann-La Roche**	**Senior Scientist (Preformulation)** **Research Associate (Preformulation)**

Physicochemical characterization of new drug candidates. Development of stability-indicating methods, HPLC, TLC, UV/IR and Fluorescence spectra. Stability screening in solution and solid state, pH-solubility profile, pH-stability profile and kinetics, pK_a determination. Salt selection studies for new drug candidates. Photodegradation and drug-excipient compatibility studies, accelerated stability. Solubility/solubilization and partitioning studies. Developed a method for measuring partition coefficients using solid phase extraction.

Also responsible for studies intended to address issues specific to discovery or development programs: QSAR studies to support drug discovery, studies on drug sorption to valve-gaskets to support aerosol development, compaction studies to support solid-dosage form formulation.

1988-1990 **Soil Science Department** **University of Florida** **Gainesville, Florida**	**Post-Doctoral Research Associate** **(Research on the fate and transport of organic compounds in complex mixtures)**

Responsible for all major technical aspects of the project: designing and conducting experiments, planning of future work, preparing and presenting progress reports to the sponsoring agency.

Analytical (HPLC) method development, chemical and scintillation counting analyses in multi-component, multi-phasic matrices, extensive measurements of solubility/partitioning in miscible and immiscible solvent mixtures, and of sorption/partitioning to natural and synthetic polymers.
Computer modeling of data; developed and published a model to predict solubility of organic compounds in non-ideal solvent mixtures.

1985-1988 **Graduate Research Assistant**
College of Pharmacy
University of Arizona

Graduate research on the theoretical and practical aspects of solubility and solubilization. Study of the relationship between chemical structure and the physicochemical properties of organic molecules in solution. Measurement of solubility and solubilization profiles in pure and mixed solvents. Extensive use of QSAR (Quantitative Structure-Activity Relationships) techniques including computer programming for modeling, computer data management, statistical analysis, and report generation.

1984-1985 **Graduate Teaching Assistant**
College of Pharmacy
University of Arizona

Teaching Pharmaceutics laboratory to undergraduates. Preparation of short introductory lecture for each session. Guiding students through the experimental exercise. Reviewing and grading students' formulated product for appearance, yield and labeling. Reviewing pre-session homework assignments, preparing and grading laboratory tests.

1981-1982 **Laboratory Assistant**
Section of Microbiology
National Univ. of Mexico

Preparing (compounding, filling and sterilizing) all necessary culture media for undergraduate Microbiology laboratory sessions. Preparing dyes used for visualization/identification of bacteria. Maintaining stock of sterilized glassware and materials needed for laboratory sessions.

EDUCATION:

1984-1988 Ph.D. in Pharmaceutical Sciences
Minor: Physical Chemistry
University of Arizona
Dissertation: Estimation of Aqueous Solubility of Organic Compounds.

1983 Internship: National General Hospital, Mexico and National University of Mexico

1978-1982 B.S. in Pharmaceutical chemistry
National University of Mexico
Mexico City, Mexico

PROFESSIONAL MEMBERSHIPS:

American Chemical Society
American Association of Pharmaceutical Scientists
Rho Chi Honor Society

DISTINCTIONS AND AWARDS:

Peer Recognition Respiratory Drug Delivery **VI,** Virginia Commonwealth University, p. 284 (1998). *J. Pharm. Sci.*, **83**, p. 1216 (1994); *Pharm. Tech.*, **18**, p. 159, (1994). "Water Solubility. Methods of Estimation for Organic Compounds" by S. H. Yalkowsky and S. Banerjee. Marcel Dekker, 1991.

1983	Diploma: Third highest undergraduate GPA National University of Mexico.
1987	Rho Chi Honor Society University of Arizona, Tucson, Arizona.
1990	Project Reviewer Electric Power Research Institute, Palo Alto, CA.
1995	Special Recognition Bonus: Departmental coordinator for Preclinical Development redesign.
1996	Management Incentive Bonus
1997	Recognition Award for 1996 Special Recognition Award for International Team Leader work
1999	Recognition award for characterization work on novel amorphous formulation
2000-2002	Land-O-Lakes Pharmaceutical Conference planning committee member
2003	Chair Land-O-Lakes Pharmaceutical Conference University of Wisconsin Theme: Molecular Pharmaceutics
2003	Silver Award Roche Research Olympiad For contribution on Integrated Drug Development work
2004	Associate Director Center for Pharmaceutical Processing Research (CPPR) Purdue University
2004	Purdue Research Foundation Fellowship. “Applications of hot-melt extrusion to the production of drug dispersions with improved drug delivery attributes for poorly soluble drugs.” (Sai Chamarthy)
2005	Director Dane O. Kildsig Center for Pharmaceutical Processing Research (CPPR) Purdue University
2005	Arden House Pharmaceutical Conference. Planning committee. Pharmaceutical Materials Science
2006 -	Proposal Reviewer National Science Foundation
2006	Seed for Success Award. Purdue University.
2007	Seed for Success Award. Purdue University.
2007	Schering-Plough Science & Innovation Award (Sai Chamarthy)
2007	Bisland Doctoral Fellowship (Sai Chamarthy)
2008	Book proposal reviewer. Wiley Books.

2008	Jenkins-Knevel Award for Outstanding Graduate Research (Michelle Papp)
2008	Lieberman Award for an outstanding graduate student in Industrial and Physical Pharmacy (Ryan McCann)
2008	Dean's Medal for distinguished service. Faculty of Pharmacy. Louis Pasteur University, Strasbourg, France.
2009	Entrepreneurial Leadership Academy Fellow. Purdue University
2010	Session Chair, Thermo-Mechanical Response of Molecular Solids: Multi-Resolution Theory, Simulations, and Experiments: Molecular Solids I. TMS 2010. 139th Annual Meeting and Exposition, The Minerals, Metals & Materials Society, Seattle, Washington.
2010	Faculty Awards of Excellence. Team Award, Pharmaceutical Engineering Research Team. Purdue University.
2010	Top Reviewer Recognition. *Journal of Pharmaceutical Sciences*
2010	PREPP - Purdue Realization and Entrepreneurship Postdoctoral and Doctoral Program (Andrew Otte, Ph.D.)
2012	Winner. "Come and dine with an Editor" competition. *International Journal of Pharmaceutics*. Chicago, Illinois.
2012	Innovation and Commercialization Center. Success Stories. Purdue University. Featured article
2013	Session Chair, 15th International Workshop on the Physical Characterization of Pharmaceutical Solids, Philadelphia, Pennsylvania.
2013-2014	Discovery Park Fellow, Bindley Biosciences Center, Purdue University. 3D Integrated Pharmaceuticals - Large Area Web Nanomanufacturing methods and preliminary testing.
2014	National Science Foundation I-Corps, Technology Selected.
2014	Innovators Hall of Fame Inductee, Purdue University.
2015	Outstanding Advisor. Purdue University Student Soybean Product Innovation. Indiana Soybean Alliance.
2015	Lieberman Book Award for outstanding graduate student (Hwee Jing Ong). Purdue University.
2016 - 2021	Purdue University Senate
2016	First place team (scientific advisor). Exfoliant for Use as Replacement for Plastic Microbeads. Purdue University Student Soybean Product Innovation. Indiana Soybean Alliance.
2017	IPEC Excipient Graduate Student Award (Carolina Mora, Ph.D. program). International Pharmaceutical Excipients Council of the Americas Foundation
2017	Graduate Student Research Award (Hwee Jing Ong). American Association of Indian Pharmaceutical Scientists
2017	Chair. Patient-Centric Focus Group. American Association of Pharmaceutical Scientists

2019	Session Chair. Indiana Summit 2019. Vellore Institute of Technology, Indiana University-Purdue University (IUPUI), Indianapolis, Indiana.
2020	Purdue University Student Soybean Product Innovation. People's Choice Award. Team scientific advisor. Non-Toxic, Biodegradable Filament for Use in 3D Printing. Indiana Soybean Alliance.
2021	Purdue University Student Soybean Product Innovation. Second Place. Team scientific advisor. Eco-friendly replacement for cosmetic face masks. Indiana Soybean Alliance.
2021	Graduate Teaching Award (Valeria Tellez). Purdue University.
2021	J-Stage Featured Article. Japan Science and Technology Agency (*KONA Powd. Part. J.* **37**, 195-213 (2020).
2022	Purdue University Student Soybean Product Innovation. Third Place. Team scientific advisor. Biodegradable film to replace compostable plastic agricultural mulch film. Indiana Soybean Alliance.
2023	Purdue University Student Soybean Product Innovation. First Place. Team scientific advisor. Plant based, wholly compostable packaging material. Indiana Soybean Alliance.
2023	Guest editor. "Enhancing the bioavailability of poorly soluble drugs" Special Issue. *Pharmaceutics*.
2023	College of Pharmacy Research Highlight for Tunable Dosage Forms. Purdue University. *Pharmaceutics* (2023) 15(7): 1905.

JOURNAL REVIEWER:

AAPS Journal
AAPS PharmSciTech
ACS Omega
Analytical Chemistry Letters
Analytical Methods
Chemosphere
Colloids and Surfaces A
Critical Reviews in Environmental Science and Technology
Critical Reviews in Therapeutic Drug Carrier Systems
Crystal Growth and Design
Current Opinion in Food Science
Drug Development and Industrial Pharmacy
Environmental Science and Technology
European Journal of Pharmaceutics and Biopharmaceutics
Expert Opinion on Drug Delivery
Food Science and Technology
Industrial & Engineering Chemistry Research
Int. J. of Nanomaterials, Nanotechnology and Nanomedicine
International Journal of Biological Macromolecules
International Journal of Pharmaceutics
Journal of Chemical and Engineering Data
Journal of Chemical Physics
Journal of Controlled Release
Journal of Food and Agricultural Sciences
Journal of Insights in Anthropology
Journal of Pharmaceutical Innovation
Journal of Pharmaceutical Sciences
Journal of Physical Chemistry
Journal of Solution Chemistry
Journal of the Air and Waste Management Association
Journal of Thermal Analysis and Calorimetry
Materials
Materials Chemistry and Physics
Medicinal Chemistry Letters
Metallurgical and Materials Transactions A
Molecular Pharmaceutics
Molecules
Pharmaceutical Development and Technology
Pharmaceutical Research
Pharmaceutics
Pharmacy
Physical Chemistry Chemical Physics
Polymer
Powder Technology
Spectrochimica Acta
Thermochimica Acta

PUBLICATIONS:

M.A. Cano-Vega, L.M. Arango-Salazar and R. Pinal. Tunable drug release rate using modular oral dosage forms. *Pharmaceutics* (2023) 15(7): 1905.

J.J. Carrascal, R. Pinal, T. Carvajal, L.D. Pérez and Y. Baena. Benzoic acid complexes with Eudragit E100®: New alternative antimicrobial preservatives. *Int. J. Pharm.* 607, 120991 (2021).

M.A. Cano-Vega, M. Deng and R. Pinal. Modular solid dosage form design – Application to pH-independent release of a weak-base API. *Int. J. Pharm.* 601, 120518 (2021).

E.A. Munchow, A.F. da Silva, E. Piva, C.E. Cuevas-Suarez, M.T.P. de Albuquerque, R. Pinal, R.L. Gregory, L. Breschi and M.C. Bottino. Development of an antibacterial and anti-metalloproteinase dental adhesive for long-lasting resin composite restorations. *J Mat. Chem. B*. 8, 10797-10811 (2020).

C.P. Mora, J.M. Martinez-Alejo, L. Roman, M.M. Martinez, T. Carvajal T., R. Pinal and C.E. Mora-Huertas. Molecular and physical characterization of octenyl succinic anhydride-modified starches with potential applications in pharmaceutics. Int. J. Pharm. 579, 119163 (2020).

R. Pinal and M.T. Carvajal. Integrating particle microstructure, surface and mechanical characterization with bulk powder processing. *KONA Powd. Part. J.* **37**, 195-213 (2020).

S. Pérez-Buitrago, P. Mena-Giraldo, R. Pinal and L. Hoyos-Palacio. Azopolymer based nanoparticles for phototriggered drug delivery. *IEEE Xplore*, Oct. 1089-1092 (2019).

D. Cebeci-Maltaş, R. Pinal, L. Taylor and D. Ben-Amotz, Spatial light modulators as PAT sensors: Raman applications. *Eur. Pharm. Rev*. **23**, 72-74 (2018).

T. Marín, P. Montoya, O. Arnache, R. Pinal, J. Calderón. Bioactive films of zein/magnetite magnetically stimuli-responsive for controlled drug release. *J. Magn. Magn. Mater*. **458**, 355-364 (2018).

T. Marín, P. Montoya, O. Arnache, R. Pinal and J. Calderon. Development of magnetite nanoparticles/gelatin composite films for triggering drug release by an external magnetic field. *Materials and Design*, **152**, 78-87 (2018).

G.J. Colmenares-Roldan, L.M. Agudelo-Gomez, J.A. Carlos-Cornelio, L.F. Rodriguez, R. Pinal, R. and L.M. Hoyos-Palacio. Production of polycaprolactone nanoparticles with low polydispersity index in a tubular recirculating system by using a multifactorial design of experiments. *J. Nanopart. Res*. **20:68** (2018).

H. J. Ong and R. Pinal. Drug solubilization by means of a surface-modified edible biopolymer enabled by hot melt extrusion. *J. Pharm. Sci.* **107**, 402-411 (2018).

P. Myrdal, K. Morris, R. Pinal, N. Jain, P.L.D. Wildfong and G. Zografi. Professor Samuel H. Yalkowsky: Scientist, mentor, and molecular empath. *J. Pharm. Sci.* **107**, 2-4 (2018).

D. Cebeci-Maltaş, D. Ben-Amotz, M. A. Alam, P. Wang and R. Pinal. Photobleaching profile of Raman peaks and fluorescence background. *Eur. Pharm. Rev*. Issue 6 (2017).

Y. Song, D. Zemlyanov, X. Chen, Z. Su, H. Nie, J.W. Lubach, D. Smith, S. Byrn and R. Pinal. Acid-base interactions in amorphous solid dispersions of lumefantrine prepared by spray-drying and hot-melt extrusion using X-ray photoelectron spectroscopy. *Int. J. Pharm.* **514**, 456-464 (2016).

E.A Münchow, H.J. Hammann, M.T, Carvajal, R. Pinal, and M.C. Bottino. Stain removal effect of novel papain- and bromelain-containing gels applied to enamel. *Clin. Oral Invest.* **20**, 2315–2320 (2016).

N. Boersen, D. Belair, G. E. Peck, and R. Pinal. A dimensionless variable for the scale up and transfer of a roller compaction formulation. *Drug Dev. Ind. Pharm*. **42**, 60-69 (2016).

M. Ochoa, H. Jiang, J.H. Park, A. Otte, R. Pinal and B. Ziaie. Nanoparticle-enabled wireless monitoring and characterization of physical degradation kinetics in pharmaceutical gelatin films. *Sensors and Actuators A – Physical*, **241**, 238-244 (2016).

N. Boersen, M. T. Carvajal, K. R. Morris, G. E. Peck, and R. Pinal. The influence of API concentration on the roller compaction process: Modeling and prediction of the post compacted ribbon, granule and tablet properties using multivariate data analysis. *Drug Dev. Ind. Pharm*. **41**, 1470-1478 (2015).

M. F. Hamilton, A. D. Otte, R. L. Gregory, R. Pinal, A. Ferreira-Zandoná and M. C. Bottino. Physico-mechanical and antibacterial properties of experimental resin-based dental sealants modified with nylon-6 and chitosan nanofibers. *J. Biomed. Mat. Res. B Appl. Biomat.* **103**, 1560–1568 (2015).

A.J. Harrison, A. Otte, T. Carvajal, R. Pinal, S.P. Beaudoin. Cohesive hamaker constants and dispersive surface energies of RDX, PETN, TNT, and ammonium nitrate-based explosives. *Prop. Explos. Pyrotech.,* **40**, 892–897 (2015).

X. Chen, H. M. Fadda, A. Aburub, D. Mishra and R. Pinal. Cosolvency approach for assessing the solubility of drugs in poly(vinylpyrrolidone). *Int. J. Pharm*. **494**, 346-356 (2015).

N. Boersen, M. T. Carvajal, K. R. Morris, G.E. Peck, and R. Pinal. The influence of API concentration on the roller compaction process: modeling and prediction of the post compacted ribbon, granule and tablet properties using multivariate data analysis. *Drug Dev. Ind. Pharm*. **41**, 1470-1478 (2015).

L. Zhang, A.D. Otte, M. Xiang, D. Liu, Rodolfo Pinal. Investigation of film with β-galactosidase designed for stabilization and handling in dry configuration *Molecules*, **20**, 17180-17193 (2015).

W. Yu, R. Rahimi, M. Ochoa, R. Pinal, and B. Ziaie. A smart capsule with GI-tract-location-specific payload release. *IEEE Trans. Biomed. Eng.* **62**, 2289-2295 (2015).

K. Boksa, A. Otte and R. Pinal. Matrix-assisted cocrystallization: The simultaneous production and formulation of pharmaceutical cocrystals by hot-melt extrusion. *J. Pharm. Sci.* **103**, 2904-2910 (2014).

H. M. Fadda, X. Chen, A. Aburub, D. Mishra and R. Pinal. A novel method for determining the solubility of small molecules in aqueous media and polymer solvent systems using solution calorimetry. *Pharm. Res.* **31**, 1735-1743 (2014).

D. Cebeci-Maltas, R. McCann, P. Wang, R. Pinal, R. Romanach and D. Ben-Amotz. Pharmaceutical application of fast Raman hyperspectral imaging with compressive detection strategy. *J. Pharm. Innov.* **9**, 1-4 (2014).

S. Janaswamya, K.L. Gill, O.H. Campanella and R. Pinal. Organized polysaccharide fibers as stable drug carriers. *Carbohyd. Polym.* **94**, 209-215 (2013).

E.H. Lee, S. Byrn, and R. Pinal. The solution properties of mefenamic acid and a closely related analogue are indistinguishable in polar solvents but significantly different in nonpolar environments. *J. Pharm. Sci.* **101**, 4529-4539 (2012).

N. Shah, H. Sandhu, W. Phuapradit, R. Pinal, R. Iyer, A. Albano, A. Chatterji, S. Anand, D.-S. Choi, K. Tang, H. Tian, H. Chokshi, D. Singhal, and W. Malick. Development of novel microprecipitated bulk powder (MBP) technology for manufacturing stable amorphous formulations of poorly soluble drugs. *Int. J. Pharm.* **438**, 53-60 (2012).

A. Otte, Y. Zhang, M.T. Carvajal, and R. Pinal. Milling induces disorder in crystalline griseofulvin and order in its amorphous counterpart. *CrystEngComm* **14**, 2560-2570 (2012).

P. Wang, M. N. Slipchenko, B. Zhou, R. Pinal, and J. Cheng. Mechanisms of epi-detected stimulated Raman scattering microscopy. *IEEE J. Sel. Topics Quant. Electron*. **18**, 384-388 (2012).

M. Thommes, D. R. Ely, M. T. Carvajal and R. Pinal. Improvement of the dissolution rate of poorly soluble drugs by solid crystal suspensions. *Mol. Pharmaceutics* **8**: 727-735 (2011).

A. Zarow, B. Zhou, X. Wang, R. Pinal and Z. Iqbal. Spectroscopic and X-ray diffraction study of structural disorder in cryomilled and amorphous griseofulvin. *Appl. Spectroscopy* **65**, 135-143 (2010).

J.-Y. Kim, S. Kim, M. Papp, K. Park, and R. Pinal. Hydrotropic solubilization of poorly water-soluble drugs. *J. Pharm. Sci.*, **99**, 3953-3965 (2010).

Y. Miyako, N. Khalef, K. Matsuzaki, and R. Pinal. Solubility enhancement of hydrophobic compounds by cosolvents: Role of solute hydrophobicity on the solubilization effect. *Int. J. Pharm.*, **393**, 48-54 (2010).

C. Mao, S. P. Chamarthy, S. R. Byrn, and R. Pinal. Theoretical and experimental considerations on the enthalpic relaxation of organic glasses using differential scanning calorimetry. *J. Phys. Chem. B*, **114**, 269–279 (2010).

N. Khalef, R. Pinal, and A. Bakri. Limitations of amorphous content quantification by isothermal calorimetry using saturated salt solutions to control relative humidity: alternative methods. *J. Pharm. Sci.*, **99**, 2080-2089 (2010).

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