

Dharmendra K. Mishra, Ph.D.

745 Agriculture Mall Dr.
West Lafayette, IN 47907

Phone: (517) 203-8904
Email: mishradh@purdue.edu

EDUCATION**Ph.D., Biosystems and Agricultural Engineering** 2013

Michigan State University, East Lansing, MI

- Dissertation: A rapid testing instrument to estimate thermal properties of food materials at elevated temperatures during nonisothermal heating
- GPA: 3.78
- Advisor: Dr. Kirk D. Dolan
- Synopsis: Modeling kinetics of thermal degradation of nutrients for food quality or kinetics of microbial reduction for food safety requires reliable estimates of the thermal properties. Thermophysical properties, especially thermal conductivity and specific heat, are important in establishing thermal processes for food manufacturing, especially at higher processing temperatures. Hence, in this study, a novel instrument (TPCell) was designed and developed using principles of intrinsic verification and inverse heat conduction. With the instrument, thermal conductivity can be measured from room temperature to higher processing temperature of 140 °C. The experimental time with TPCell is less than a minute, as compared to 5-6 hours with quasi-isothermal method employed by currently available instruments. TPCell has advantages over traditional methods, as it avoids the decomposition of materials that result when achieving the quasi-isothermal state at higher temperatures. Temperature-dependent thermal properties were used to estimate the kinetic parameters of nutrient degradation during aseptic and conventional retort processing. Vitamin C and thiamin were selected as model nutrients for degradation study. Sweet potato puree was used as a food matrix.

M.S., Biosystems and Agricultural Engineering 2008

Michigan State University, East Lansing, MI

- Thesis: Estimation of kinetic parameters for degradation of anthocyanins in grape pomace
- GPA: 3.73
- Advisor: Dr. Kirk D. Dolan
- Synopsis: Degradation of nutraceuticals in low- and intermediate-moisture foods heated at high temperature (>100 °C) is difficult to model because of the nonisothermal condition. Isothermal experiments above 100 °C are difficult to design because they require high pressure and small sample size in sealed containers. Therefore, a Nonisothermal method was developed to estimate the thermal degradation kinetic parameter of nutraceuticals and determine the confidence intervals for the parameters and the predicted concentration. Thermal conductivity (k) and specific heat (Cp) were estimated as quadratic functions of temperature using Comsol and nonlinear regression. The k and Cp functions were then used to predict temperature inside the grape pomace during retorting and degradation rate constant and activation energy were estimated using nonlinear regression. These methods are useful for thermal processing design for nutraceutical products.

B.S., Agricultural Engineering 2004

Tamil Nadu Agricultural University, India

- Capstone project: Performance Testing of Diesel Engine Using Bio-Diesel (Jatropha)
- GPA: 3.68
- Advisor: Dr. Divaker Durairaj
- Synopsis: Renewable form of energy is the need of today's world and bio-based energy sources can be forefront of such initiatives. This project was designed to extract oil from a plant source jatropha seed and test its performance on tractor engine. This form of extracted oil was called bio-diesel. The performance of the tractor engine was compared with regular diesel oil and the bio-diesel. The results of the study concluded that there was no significant difference in engine performance. However, further research is needed to prove if this result is true for the usable life of the engine.

EXPERIENCE**Assistant Professor, Purdue University, West Lafayette, IN** Aug. 2016-Present

- Extension work includes helping growers and food processors on topics related to food safety and quality, thermal processing of food materials, equipment design and validation.
- Research Interests: Biological and mathematical validation techniques for novel thermal processing. Degradation kinetics of nutrients and microorganisms during thermal processing. Thermal properties of

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food materials at elevated temperatures. Smart sensors for food processing applications. Process modeling and parameter estimation.

- Sr. Process Engineer, Mead Johnson Nutrition, Evansville, IN** Oct. 2014-Aug. 2016
- Responsible for developing new aseptic processing technology for manufacturing baby formula, a \$40M project. It includes sustainable manufacturing by keeping the use of utilities to a minimum by recycling water and energy.
 - Responsible for leading a team of 18 people for aseptic liquid filling technology from different disciplines including, process engineering, packaging, product development, regulatory, supply chain and operations
 - Development of pilot plant capabilities for aseptic processing and packaging (\$5M including small scale ultra-high temperature system, aseptic bag filler, laminar flow hood filler, training equipment, microthermics® system and clean-in-place system)
 - Commercialization of the technology developed in pilot facility
 - Working with the cross functional team to define robust design of experiments for development of predictive model for nutrient degradation
- Co founder, Thermetrics Inc., East Lansing, MI** 2013-Present
- Co-founded a company, Thermetrics, based on my Ph.D. research
 - Leading the device design and manufacturing to measure thermal properties at elevated temperatures
 - Working on development of sensors based on multiphysics modeling, parameter estimation, and inverse problems
- Aseptic Thermal process Authority, Nestle Nutrition, PTC Fremont, MI** Mar. 2013-Oct. 2014
- Responsible for validation of \$140M project for commercialization of novel particulate aseptic system for Gerber baby food products
 - Developed a model for microbial validation of multiphase products in aseptic system
 - Thermal process authority for aseptic processing and responsibilities included designing and managing microbial validation work for the aseptic processing systems
 - Led interactions with Food and Drug Administration (FDA) for the commercialization of the novel aseptic processing and providing details of validation protocol and filing documents
 - Led the HACCP validation work for the new aseptic line and prepared documents to be filed with FDA
 - Led the validation work for aseptic bag filler, aseptic form-fill-seal liquid filler
 - Developed a patented rheological sensor to measure viscosity of multi-phase product
 - Provided technical assistance to Nestle factories in the area of thermal processing and spoilage incident investigation
 - Retort and hot-fill process establishment and FDA filing
 - In-house expert on mathematical modeling of processes and statistical designs
- Sr. Associate Process Engineer, Nestle Nutrition, PTC Fremont, MI** Jan. 2010-Mar. 2013
- Responsible for pilot aseptic line and aseptic filler validation, a \$10M project to investigate the viability of commercialization of baby food products
 - Led the filing of products with FDA and got approval for novel aseptic processing technology
 - Worked as a process engineer on developing and implementing new processing technologies including aseptic processing. Also worked on mathematical modeling of processes and statistical designs.
 - Developed HACCP plan for novel pilot aseptic system
 - Worked with team in designing hygienic guidelines for the aseptic system
- Statistical Consulting Center, MSU, East Lansing, MI** 2009-2010
- Worked as a statistical consultant for faculty and graduate students at Michigan State University
 - Provided statistical experimental design for conducting research experiments
 - Assisted with data analysis and statistical inferences for the project

TEACHING EXPERIENCE

- Aseptic processing lecture for better process control school (BPCS), Michigan State University, Mar. 2010-Present

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- Retort lab for course food engineering: fluids, Michigan State University, Apr. 2006-Apr. 2008
- Invited teaching for retort lab and dehydration for food processing: fruits and vegetables, Jan. 2006-Jun. 2007
- Helped with course development of modeling methods in biosystems engineering, Michigan State University, Mar. 2010-Apr. 2014

ADVISING/MENTORING

- Mentor for students in NASA MUST (Motivating Undergraduates in Science and Technology) program Apr. 2009-Feb. 2010
- Mentor for 4 graduate students in Biosystems and Agricultural Engineering at Michigan State University
- Mentor for 2 graduate students in Food Science and Human Nutrition at Michigan State University
- Consultant for 5 graduate students in School of Packaging at Michigan State University
- Mentor for 3 teams of senior design class in Biosystems and Agricultural Engineering at Michigan State University

INTERNSHIP & PROFESSIONAL DEVELOPMENT**Co-Op, Nestle Nutrition, PTC Fremont, MI**

Aug. 2008-Jul. 2009

- Worked in New Science and Technology department on the aseptic processing; determination of thermophysical and rheological properties that can be used in the mathematical modeling of aseptic processing. Worked on the biological validation of product that is processed aseptically.

Co-Op, Campbell Soup Company, Camden, NJ

Jul. 2007- Dec. 2007

- Worked as process engineer on: aseptic processing of soup with particulates, and determination of its physical properties for process filing; continuous blending of beverages (V8, splash, and V8 fusion); new business development for premium soups; and biological validation studies for new aseptic filler. Worked on flow meters to ensure accurate and consistent delivery of ingredients.

Food Product Development Team, Michigan State University

2006-2007

- Involved in developing an extruded fruit product
- Involved in developing a new pasta based product and process design

Graduate Research Assistant, Michigan State University

May 2005-December 2009

Kinetic parameter estimation for the degradation of nutraceutical compounds in low-moisture and high-temperature processed foods. Used inverse problems to estimate thermal properties at elevated temperatures.

HACCP Certification Course at Michigan State University

Oct. 2006

Successfully completed a one-week short course program in Food Safety - HACCP

INVITED SPEAKER

FS 684 Seminar Class Purdue Food Science

Oct. 2016

- Parameter Estimation and Predictive Modeling in Dynamic Food Processes

Better Process Control School, East Lansing, MI

Mar. 2010-2015

- Aseptic processing and packaging systems (1.5 hour lecture)

Michigan Environmental Health Association (MEHA), Big Rapids, MI

2014

- Food safety: How to address shelf stable and perishable foods?

Inverse Problems Symposium (IPS), Huntsville, AL

2013

- Keynote presentation - A novel instrument for rapid estimation of temperature-dependent thermal properties up to 140°C

Institute of Thermal Processing Specialists (IFTPS), San Antonio, TX

2013

- Inverse problems and parameter estimation as it applies to modeling

Institute of Thermal Processing Specialists (IFTPS), San Antonio, TX

2012

- Why validate controls for aseptic systems?

PEER REVIEWED PUBLICATIONS

1. Greiby I, **Mishra DK**, Dolan KD, Siddiq M. 2017. Inverse method to estimate anthocyanin degradation kinetic parameters in cherry pomace during non-isothermal heating. Submitted to Journal of Food Engineering 198, 54-62.
2. Muramatsu Y, Greiby I, **Mishra DK**, Dolan KD. 2017. Rapid Inverse Method to Measure Thermal Diffusivity of Low-Moisture Foods. Journal of Food Science 82(2), 420-428.
3. Cattani F, Dolan KD, Oliveira SD, **Mishra DK**, Ferreira CAS, Periago PM, Aznar A, Fernandez PS, Valdramidis VP. 2016. One-step global parameter estimation of kinetic inactivation parameters for *Bacillus sporothermodurans* spores under static and dynamic thermal processes. Food Research International. doi:<http://dx.doi.org/10.1016/j.foodres.2016.08.027>
4. **Mishra DK**, Dolan KD, Beck JV, Ozadali F. 2016. A novel instrument for rapid measurement of temperature-dependent thermal properties of conduction-heated food up to 140°C. Journal of Food Engineering 191: 19-27.
5. Greiby I, **Mishra DK**, Dolan KD. 2014. Inverse method to sequentially estimate temperature-dependent thermal conductivity of cherry pomace during nonisothermal heating. Journal of Food Engineering 127:16-23.
6. Dolan KD, **Mishra DK**. 2013. Parameter estimation in food science. Annual Review of Food Science and Technology 4:401-22.
7. Dolan KD, Valdramidis VP, **Mishra DK**. 2013. Parameter estimation for dynamic microbial inactivation: which model, which precision? Food Control 29(2):401-8.
8. Sulaiman R, Dolan KD, **Mishra DK**. 2012. Simultaneous and sequential estimation of kinetic parameters in a starch viscosity model. Journal of Food Engineering 114(3):313-22.
9. **Mishra DK**, Dolan KD, Yang L. 2011. Bootstrap confidence intervals for the kinetic parameters of degradation of anthocyanins in grape pomace. Journal of Food Process Engineering 34(4):1220-33.
10. **Mishra DK**, Dolan KD, Yang L. 2008. Confidence intervals for modeling anthocyanin retention in grape pomace during nonisothermal heating. Journal of Food Science 73(1):E9-E15.

MANUSCRIPT IN PREPARATION

1. **Mishra DK**, Dolan KD, Beck JV, Ozadali F. 2016. Intrinsic verification in parameter estimation problems for temperature-dependent thermal properties. International Journal of Thermal Sciences.
2. **Mishra DK**, Dolan KD, Beck JV, Ozadali F. 2016. Use of scaled sensitivity coefficient relations for intrinsic verification of numerical codes and parameter estimation. Numerical Heat Transfer, Part A: Applications.

BOOK CHAPTERS

1. Dolan KD, Habtegebriel H, Valdramidis VP, **Mishra DK**. 2015. 2 - Thermal processing and kinetic modeling of inactivation. In: Fryer SBKJ, editor. Modeling Food Processing Operations: Woodhead Publishing. p. 37-66.
2. Dolan KD, **Mishra DK**. 2014. Parameter identification under dynamic temperature conditions and optimization algorithms in inactivation kinetics. Woodhouse Publishing.
3. Matella NJ, **Mishra DK**, Dolan KD. 2012. Hydration, blanching and thermal processing of dry beans. In: Siddiq M, Uebersax MA, editors. Dry beans and pulses: Production, processing and nutrition. Wiley-Blackwell: Iowa, USA. p. 129.
4. Ahmed J, Dolan KD, **Mishra DK**. 2012. Chemical reaction kinetics pertaining to foods. In: Ahmed J, Rahman MS, editors. Handbook of food process design. Wiley-Blackwell: Iowa, USA. p. 113.
5. **Mishra DK**, Sinha NK. 2010. Principles of vegetable canning. In: Sinha NK, Hui Y, editors. Handbook of vegetables and vegetable processing. Wiley-Blackwell: Iowa, USA. p. 243-58.

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PATENTS

1. **Mishra DK**, Dolan KD, Beck JV. Testing system for estimating thermal properties of materials. US Patent No.: US 9,568,443 B2. Date of Patent: Feb. 14, 2017.
2. Brannan MR, Chappell Jr RL, Dzikowicz AE, Mann JE, **Mishra DK**, Peterson SD, Sarachman MJ. Systems and methods for manufacturing multi-compartment products containing wet and dry components. US Patent No.: US 9,434,527 B2. Date of Patent: Sep. 6, 2016.
3. Ozadali F, **Mishra DK**, Sulaiman R. Mixer sensors and methods for using same. US Patent No.: US 9,612,184 B2. Date of Patent: Apr. 04, 2017.
4. Chappell Jr RL, Dzikowicz Jr AE, Mann JE, **Mishra DK**, Peterson SD, Sarachman MJ. 2013. Multi-compartment products containing wet and dry food components. US Patent 20,130,122,138.

GRANT WRITING

Industry grant, Nestle Nutrition

A rapid testing instrument to estimate thermal properties of food materials at elevated temperatures during nonisothermal heating. Status: funded. 2010

United States Department of Agriculture (USDA)

Program Area: A4141: Addressing Critical and Emerging Food Safety Issues. A User-Friendly Software Interface for Forward and Inverse Commercial Food Safety Problems. Status: not funded. 2012

United States Department of Agriculture (USDA)

AFRI foundational grant: A User-Friendly Software Interface for Solving Multi-Quality Forward and Inverse Commercial Food Problems. Status: not funded. 2013

National Science Foundation (NSF)

Rapid Testing Device to Estimate Temperature-Dependent Thermal Conductivity of Conduction-Heated Materials. Status: not funded. 2013

United States Department of Agriculture (USDA)

AFRI foundational grant: Systematic Method to Solving Multi-Quality Forward and Inverse Commercial Food Problems. Status: not funded. 2014

Use of a non-pathogenic surrogate organism for validation of high acid and acidified food products. Mishra DK, Deering AJ. AgSEED, \$50,000, 1 year. 2016

A Device for Rapid Estimation of Temperature Dependent Thermal Properties for Food Processing Systems. Mishra DK, Varney M. NSF STTR, \$225,000, 1 year. 2016

Development of a Grower Advisory Tool for Manure Management in Produce. Scott M, Deering AJ, Cook K, Kalbaugh K, Mishra DK. Center for produce Safety Pre-Proposal, \$223,500, 2 year. 2016

USDA SBIR – A Novel Instrument for Designing Thermal Process of Food. Mishra DK, Varney M. USDA SBIR, \$100,000, 1 year. 2016

Dynamic Risk Modeling for Pathogen Detection in Fresh Produce Supply Chain. Mishra DK. Center for produce Safety Pre-Proposal, \$225,926, 2 years. 2016

Development and use of remote sensing instrument and predictive modeling software for corrective action alert system. Mishra DK. Center for produce Safety Pre-Proposal, \$48,500, 1 year. 2016

EDITORIAL BOARD

1. Journal of Food Process Engineering
2. Mathematical Modelling and Applications

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3. International Journal of Trends and Technologies in Food Processing

REVIEWER

1. Journal of Food Science
2. Journal of Food Engineering
3. Food Control
4. Mathematical Modelling and Applications

TRADE JOURNAL

1. Bornhorst GM, **Mishra DK**, Siddiq M, Dolan KD. 2008. Quantifying thermal degradation of anthocyanins in black bean flour (*Phaseolus Vulgaris* L.). Annual Report - Bean Improvement Cooperative 51:140.

CONFERENCE PRESENTATIONS

1. Beck JV., **Mishra DK**, Dolan KD. 2017. Utilization of Generalized Transient Heat Conduction Solutions in Parameter Estimation. Inverse Problems Symposium (IPS).
2. Dolan KD, Mishra DK, Valdramidis VP. 2016. Predictive Modeling Under Dynamic Conditions in Food Processing Environments. FOODSIM'2016, April 3-7, 2016, Catholic University Leuven, Ghent, Belgium
3. Samsudin H, Auras R, Dolan KD, **Mishra DK**, Soto-Valdez H. 2015. Comparison between Two and Three-Parameter Models to Describe a Migration Study. Inverse Problems Symposium. East Lansing, USA.
4. Samsudin H, Auras R, Dolan KD, **Mishra DK**, Soto-Valdez H. 2014. Application of parameter estimation to predict migration in antioxidant films. Shelf Life International Meeting. New Jersey, USA.
5. **Mishra DK**, Dolan KD. 2014. Estimation of microbial kinetic parameters under dynamic thermal processes targeting on the inactivation of *Bacillus sporothermodurans* spores. International Conference on Inverse Problems in Engineering. Cracow, Poland.
6. Marzola A, deMonte F, **Mishra DK**. 2014. An efficient technique for computing sensitivity coefficients of solid materials for thermal property measurements. International Conference on Inverse Problems in Engineering. Cracow, Poland.
7. Greiby I, Dolan KD, **Mishra DK**. 2014. Inverse methods to estimate anthocyanin degradation kinetic parameters in cherry pomace during non-isothermal heating. International Conference on Advances in Business and Economics. Istanbul, Turkey.
8. Dolan KD, Gumudavelli V, **Mishra DK**, Subbiah J, Thippareddi H, Velugoti PR, G F. 2014. Inverse method to estimate microbial growth parameters under dynamic temperature conditions for *Salmonella* Enteritidis in egg yolk. International Conference on Inverse Problems in Engineering. Cracow, Poland.
9. **Mishra DK**, Dolan KD, Beck JV. 2013. Use of scaled sensitivity coefficient relations for intrinsic verification of numerical codes and parameter estimation. Inverse Problems Symposium (IPS). Alabama, USA.
10. **Mishra DK**. 2013. A rapid testing instrument to estimate thermal properties of food materials at elevated temperatures during Nonisothermal heating. [Ph.D.]: Michigan State University, USA.
11. Greiby I, Dolan KD, **Mishra DK**. 2013. Inverse methods to estimate anthocyanin degradation kinetic parameters in cherry pomace during non-isothermal heating. Inverse Problems Symposium (IPS). Alabama, USA.
12. Dolan KD, Valdramidis VP, **Mishra DK**. 2013. A decision support tool for multi-quality forward and inverse commercial food problems. International Conference on Predictive Modeling in Food. Paris, France.
13. Dolan KD, **Mishra DK**. 2013. A user-friendly software interface for parameter estimation in the food industry. Inverse Problems Symposium (IPS). Alabama, USA.
14. **Mishra DK**, Dolan KD, Beck JV. 2012. Sequential estimation of kinetic parameters for nutraceutical degradation using the Arrhenius model. Conference of Food Engineering (CoFE). Virginia, USA.

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15. Greiby I, **Mishra DK**, Dolan KD. 2012. Estimation of thermal properties and anthocyanin retention in cherry pomace at different moisture contents during non-isothermal heating. Inverse Problems Symposium (IPS) East Lansing, MI, USA.
16. Dolan KD, Valdramidis VP, **Mishra DK**. 2012. Parameter estimation for dynamic microbial estimation: which model, which precision? . Inverse Problems Symposium (IPS). East Lansing, MI, USA.
17. Dolan KD, Valdramidis VP, **Mishra DK**. 2012. Towards the modeling of sublethal/adaptive microbial responses under dynamic conditions. Institute of Food Technologists Annual Meeting (IFT). Las Vegas, NV, USA.
18. Greiby I, **Mishra DK**, Dolan KD, Siddiq M. 2011. Estimation of temperature-dependent thermal diffusivity and anthocyanin retention in cherry pomace during nonisothermal heating. Institute of Food Technologists Annual Meeting (IFT). New Orleans, FL, USA.
19. Greiby I, **Mishra DK**, Dolan KD. 2011. Sequential estimation of temperature-dependent thermal diffusivity in cherry pomace during non-isothermal heating. Comsol Users Conference Boston, USA.
20. Dolan KD, Valdramidis VP, **Mishra DK**. 2011. Parameter estimation for dynamic microbial estimation: which model, which precision? International Committee of Predictive Modeling in Food (ICPMF). Dublin, Ireland.
21. **Mishra DK**, Dolan KD, Benyathiar P, Harte B. 2010. Sequential estimation of parameters in the Gompertz microbial growth model. Institute of Food Technologists Annual Meeting (IFT). Chicago, IL, USA.
22. **Mishra DK**, Dolan KD. 2010. Sequential estimation of microbial inactivation Arrhenius parameters for non-isotherm heating processes. Inverse Problems Symposium (IPS). East Lansing, MI, USA.
23. **Mishra DK**, Dolan KD, Yang L. 2009. Multi-parameter estimation and parameter confidence regions for degradation of anthocyanins in grape pomace. Graduate Academic Conference (GAC). East Lansing, MI, USA.
24. **Mishra DK**, Dolan KD, Beck JV. 2009. Sequential estimation of kinetic parameters for nutraceutical degradation using the Arrhenius model. Conference of Food Engineering (CoFE). Ohio, USA.
25. **Mishra DK**, Dolan KD, Beck JV. 2009. Modeling microbial growth in fresh asparagus packed in modified atmosphere packaging and vacuum skin packaging microwaveable trays. Inverse Problems Symposium (IPS). East Lansing, MI, USA.
26. **Mishra DK**, Dolan KD, Beck JV. 2009. Sequential estimation of kinetic parameters for nutraceutical degradation using the Arrhenius model. Inverse Problems Symposium (IPS). East Lansing, MI, USA.
27. **Mishra DK**, Dolan KD, Beck JV. 2009. Optimal experimental design to estimate thermal degradation kinetic parameters for nutraceuticals in intermediate-moisture foods. American Society of Agricultural and Biological Engineers (ASABE). Reno, NV, USA.
28. Breen P, **Mishra DK**, Dolan KD. 2009. Estimation of thermal diffusivity of cherry pomace at high temperatures. Institute of Food Technologists Annual Meeting (IFT). Anaheim, CA, USA.
29. Tanojo A, **Mishra DK**, Dolan KD. 2008. Modeling thermal degradation of encapsulated food-grade β -carotene in wheat flour. Institute of Food Technologists Annual Meeting. New Orleans, FL, USA.
30. **Mishra DK**, Dolan KD, Yang L. 2008. Multi-parameter estimation and parameter confidence regions for degradation of anthocyanins in grape pomace. Institute of Food Technologists Annual Meeting. New Orleans, FL, USA.
31. **Mishra DK**, Dolan KD, Yang L. 2008. Thermal and kinetic parameter estimation and sensitivity analysis for the degradation of anthocyanins in grape pomace. American Institute of Chemical Engineers (AIChE). Chicago, IL, USA
32. **Mishra DK**, Dolan KD, Benyathiar P, Harte B. 2008. Modeling microbial growth in fresh asparagus packed in modified atmosphere packaging and vacuum skin packaging microwaveable trays. International Association of Packaging Research Institutes (IAPRI) World Conference on Packaging. Bangkok, Thailand.

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33. **Mishra DK**, Dolan KD. 2008. Kinetic parameter estimation for degradation of anthocyanins in grape pomace. International Short Course "Food Processing, Packaging, and Value-addition" MI, USA.
34. Bornhorst G, **Mishra DK**, Dolan KD. 2008. Quantifying thermal degradation of anthocyanins in black bean flour (*Phaseolus vulgaris* L.). Institute of Food Technologists Annual Meeting. New Orleans, FL, USA.
35. **Mishra DK**, Dolan KD, Yang L. 2007. Bootstrap confidence intervals for kinetic degradation of anthocyanins in grape pomace. Inverse Problems Symposium. East Lansing, MI, USA.
36. **Mishra DK**, Dolan KD, Yang L. 2007. Bootstrap confidence interval for the kinetic parameters for degradation of anthocyanins in grape pomace. Institute of Food Technologists Annual Meeting. Chicago, IL, USA.
37. **Mishra DK**, Dolan KD, Yang L. 2006. Estimation of kinetic parameters for degradation of anthocyanins in grape pomace. Institute of Food Technologists Annual Meeting. Orlando, FL, USA.
38. **Mishra DK**, Dolan KD. 2006. Use of comsol to estimate the thermal properties and kinetic parameters for the degradation of anthocyanins in grape pomace. Comsol Users Conference Boston, USA.

AWARDS AND ACHIEVEMENTS

- Fitch H. Beach award for outstanding graduate research, Michigan State University, 2013
- Outstanding BE research fellowship, Michigan State University, 2013
- Institute of Thermal Processing Specialists (IFTPS) PhD scholarship through IFT Feeding Tomorrow program, 2012
- Diversity scholarship from the Great Lakes Section of Institute of Food Technologists (GLS-IFT), 2010
- Diversity scholarship from the Great Lakes Section of Institute of Food Technologists (GLS-IFT), 2009
- AE endowment fellowship, Biosystems Engineering, Michigan State University, 2008-2009
- Ph.D. achievement award, Institute of Food Technologist-Great Lakes Section, 2008
- Organizer for "student night and award" – Great Lakes Section of IFT, 2008
- Bill and Rita Stout scholarship, Biosystems Engineering, Michigan State university, 2007-2008
- Merle and Catherine Esmay scholarship, Biosystems Engineering, Michigan State University, 2006-2007
- Gold Medalist and Best Student award at Tamil Nadu Agricultural University, India, 2004

ORGANIZATIONS AND AFILIATIONS

- The Institute of Food Technologist (IFT), 2005 - present
- Institute of Thermal Processing Specialists, 2008 - present
- American Institute of Chemical Engineers, 2009
- International Association of Packaging Research Institutes (IAPRI), 2008