

Melissa Montalbo-Lomboy

Education

- PhD: **Biorenewable Resources and Technology**
Agricultural and Biosystems Engineering Dept. (ABE)
Iowa State University (ISU), Ames, Iowa, 2006-2008
Dissertation: "Ultrasonic Pretreatment for Enhanced Saccharification and Fermentation in Ethanol Production from Corn"
- MEng: **Food Engineering and Bioprocess Technology**
Asian Institute of Technology (AIT)
Pathum Thani, Thailand, 2003-2004
Thesis: "Production and Modeling of Probiotic Lactobacillus casei Growth in Batch and Fed Batch Fermentation"
- BSc: **Chemical Engineering**
University of St. La Salle (USLS)
Bacolod City, Philippines 1996-2001
Thesis: "The relationship of the number of bottles washed on odor, TSS, TDS of the caustic soda solution used in a bottling plant"

Award

- **Graduate Research Award**, Alexandria, Washington DC., 7th April 2008
Presented by: Ultrasonics Industry Association (UIA)
Sponsored by: Ethicon Endo-Surgical Inc. (A Johnson & Johnson Co.)
- **Research Excellence Award**, Iowa State University, 19th December 2008
Presented by: Iowa State University
- **BioVision.Nxt Fellow, "Class of 2009"**, Lyon, France, 8-11th March 2009
Presented by: BioVision, World Life Science Forum
- **ASABE PhD Graduate Student Award for Iowa Section**, Iowa State University, 24th April 2009,
Presented by: American Society of Agricultural and Biological Engineering (ASABE)
- **R&D 100 Award for "MycoFuel, MycoInnovations"**, Orlando, Florida, 12th November 2009,
Presented by: Industrial Research, R & D Magazine

Employment

- Iowa State University, Ames, Iowa
Post-doctoral Research Associate, January 2009 – present
- Iowa State University Extension, CIRAS, Ames, Iowa
Project Coordinator (USDA BioPreferred Program), February 2009 - present
- Iowa State University, Ames, Iowa
Visiting Scholar/Researcher, January - March 2006
- Asian Institute of Technology, Pathumthani, Thailand
Research Associate, 2004-2006
- Asian Alcohol Corp., Negros Occidental, Philippines
Research assistant, QC analyst, & Wastewater Treatment Plant supervisor, 2002

Publications

- C. Visvanathan, M.K. Choudhary, M. T. Montalbo and V. Jegatheesan, "Landfill Leachate Treatment using Thermophilic Membrane Bioreactor", *Desalination* 204:8-16, 2006.
- M. Montalbo, S.M.S.M.K. Samarakorn, C. Visvanathan, K. Fukushi and K. Yamamoto, "Development of an Integrated Decentralized Sanitation System using Aerobic Membrane Bioreactor" IWA special issue on "*Southeast Asian Water Environment 2*", p271, 2006.
- Samir Kumar Khanal, Melissa Montalbo, J. (Hans) van Leeuwen, Gowrishanker Srinivasan, and David Grewell, "Ultrasound enhanced glucose release from corn in ethanol plants" *Biotechnology and Bioengineering* 98(5):978-985, 2007.
- Melissa Montalbo-Lomboy, Lawrence Johnson, Samir Kumar Khanal, J. (Hans) van Leeuwen and David Grewell, "Sonication of Sugary-2 corn: A Potential Pretreatment to Enhance Sugar Release" *Bioresource Technology*, 101(1), 351-358, 2010.
- Melissa Montalbo-Lomboy, Samir Kumar Khanal, J(Hans) van Leeuwen, D Raj Raman, Larson Dunn Jr., and David Grewell, "Ultrasonic Pretreatment of Corn Slurry for Saccharification: A Comparison of Batch and Continuous systems" submitted to *Ultrasonics Sonochemistry*, 17(5):939-946.

Conferences

- Samir Khanal, Melissa Montalbo, J. (Hans) van Leeuwen, Gowrishankar Srinivasan, and David Grewell, "Ultrasonic Enhanced Liquefaction and Saccharification of Corn for Bio-Fuel Production" *ASABE Annual International Meeting (AIM)*, Minneapolis, Minnesota, June 17-20, 2007.
- Melissa Montalbo-Lomboy, Gowrishankar Srinivasan, Raj Raman, Robert P. Anex Jr., and David Grewell, "Influence of Ultrasonics in Ammonia Steeped Switchgrass for Enzymatic Hydrolysis" *ASABE Annual International Meeting (AIM)*, Minneapolis, Minnesota, June 17-20, 2007.
- Melissa Montalbo-Lomboy, Lawrence Johnson and David Grewell, "Ultrasonication of Sugary-2 Corn: Enhanced Sugar Yield", *ASABE Annual International Meeting (AIM)*, Rhode Island, June 29-July 2, 2008.
- Melissa Montalbo-Lomboy "Ultrasound Pretreatment of Corn Slurry for Enhanced Saccharification", *Ultrasonics Industry Association (UIA) Symposium*, Alexandria, Washington DC, April 7-9, 2008.
- Melissa Montalbo-Lomboy, Samir Kumar Khanal, J (Hans) van Leeuwen, Raj D Raman, Larson Dunn Jr., and David Grewell "Ultrasonic pretreatment of corn slurry in batch and continuous systems" *American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting*, Reno, Nevada, June 21-24, 2009.
- Melissa Montalbo-Lomboy, Samir Kumar Khanal, J (Hans) van Leeuwen, Raj D Raman, Larson Dunn Jr., and David Grewell "Simultaneous saccharification and fermentation of ultrasonically treated corn slurry" *American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting*, Reno, Nevada, June 21-24, 2009.

Research Interest

- Simultaneous saccharification and fermentation (SSF) and enzymatic hydrolysis of pretreated biomass
- Fermentation modeling
- Application of ultrasonication in corn ethanol plants

Current Research

IBOS (Interactive Biorefinery Operations Simulations)

- IBOS or interactive biorefinery operations simulations is a biofuel simulations created as a teaching tool in a biofuel course curriculum. It was designed such that students can train and learn how to run an ethanol or biodiesel plant using computer controlled simulated biorefineries.

Use of ultrasonication in lignocellulosic pretreatments

- The recalcitrance of lignocellulosic biomass such as corn stover, switchgrass, and wood is a major challenge to the use of biomass as a feedstock for biochemical conversion to liquid transportation fuels. This requires application of physical and chemical pretreatment prior to enzymatic hydrolysis and fermentation. This research explores the use of ultrasound integrated with other pretreatment methods such as ammonia steeping, alkaline treatment, and ionic liquid dissolution. The objective is to explore the synergistic effect of ultrasound with these pretreatment methods.

Controlled Gelatinization of Corn Starch using Ultrasonics

- Starch has been used in many food processing applications, where it is cooked to deliver stable products. Currently, methods for producing instant starches either involve use of harsh chemicals or energy intensive processes. In order not to use harsh chemicals, high power ultrasound is explored to determine its potential to control the partial gelatinization of starch.

Characterization of zein protein

- Zein or corn protein is a co-product in wet milling plants. Depending on the extraction and processing, the properties of zein may vary, which can thereby further influence the thermo-mechanical properties and physical attributes of zein-based products (plastics or composites). The goal of this research is to characterize zein produced using different processes and establish its effects to the properties of the zein based products.