

Michael P. Dzakovich, PhD

Research Plant Physiologist
Assistant Professor of Pediatric Nutrition
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Education and Training:

NC State University	Food, Bioprocessing, and Engineering	Postdoc.	2021
The Ohio State University	Horticulture and Crop Science	Ph.D.	2020
Purdue University	Horticultural Science	M.S.	2015
Purdue University	Horticultural Science	B.S.	2013

Professional Experience:

2021-Present	Research Plant Physiologist, USDA-ARS Children's Nutrition Research Center/Asst. Professor, Dept. of Pediatrics, Baylor College of Medicine
2020-2021	Postdoctoral Research Scholar, Dept. of Food, Bioprocessing, and Engineering, NC State University
2019-2020	Graduate Research Associate, Dept. of Horticulture and Crop Science, The Ohio State University
2017-2019	USDA National Needs Research Fellow, Dept. of Horticulture and Crop Science, The Ohio State University
2015-2017	Graduate School Fellow, Dept. of Horticulture and Crop Science, The Ohio State University
2013-2015	Graduate Research Fellow, Dept. of Horticulture and Landscape Architecture, Purdue University

Select Honors and Awards:

USDA National Needs Fellowship, 2017-2019
Ohio Valley Institute of Food Technologists Poster Competition Finalist, 2018
First Place HCS Research Symposium PhD Oral Presentation Competition, 2018
First Place Plant Science Symposium Poster Competition, 2018

Publications:

- Sholola, M.J., Goggans, M.L., **Dzakovich, M.P.**, Goggans, M.L., Francis, D.M., Jacobi, S.K., and Cooperstone, J.L. [Discovery of steroidal alkaloid metabolites and their accumulation in pigs after short-term tomato consumption](#). 2024. (Submitted: *Mol. Nutr. Food Res.* bioRxiv preprint: doi: 2024.02.05.579005)
- Dzakovich, M.P.**, Goggans, M.L., Thomas-Ahner, J.M., Moran, N.E., Clinton, S.K., Francis, D.M., and Cooperstone, J.L. [Transcriptomics and Metabolomics Reveal Tomato Consumption Alters Hepatic Xenobiotic Metabolism and Induces Steroidal Alkaloid Metabolite Accumulation in Mice](#). 2024. (*Mol. Nutr. Food Res.* doi: [10.1002/mnfr.202300239](https://doi.org/10.1002/mnfr.202300239))
- Dzakovich, M.P.**, Debelo, H, Albertsen, M.C., Che, P. Todd, J.J., Simon, M.K., Zhao, Z-Y., Glassman, K., and Ferruzzi, M.G. [Trait Stacking Simultaneously Enhances Provitamin A](#)

- [Carotenoid and Mineral Bioaccessibility in Biofortified *Sorghum bicolor*](#). *Food and Function*, 2023; 14, 7053 – 7065. doi: 10.1039/d2fo03606a)
- Dzakovich, M.P.**, Francis, D.M., Cooperstone, J.L. [Steroidal Alkaloid Biosynthesis is Coordinately Regulated Differs Among Tomatoes in the Red Fruited Clade](#). *The Plant Genome*. 2022; doi: 10.1002/tpg2.20192
- Dzakovich, M.P.**, Hartman, J.L., Cooperstone, J.L. [A High-Throughput Extraction and Analysis Method for Steroidal Glycoalkaloids in Tomato](#). *Front. Plant Sci.* 2020; 11(6). doi: 10.3389/fpls.2020.00767
- Shetge, S.A., **Dzakovich, M.P.**, Cooperstone, J.L., Kleinmeier, D., and Redan, B.W. [Concentrations of the Opium Alkaloids Morphine, Codeine, and Thebaine in Poppy Seeds Are Reduced After Thermal and Washing Treatments but Are Not Affected When Incorporated in a Model Baked Product](#). *Ag. And Food Chem.* 2020; 68(18):5241-5248. doi: 10.1021/acs.jafc.0c01681
- Dzakovich, M.P.**, Gas-Pascual, E., Orchard, C.J., Sari, E.N., Riedl, K.M., Schwartz, S.J., Francis, D.M., Cooperstone, J.L. [Analysis of tomato carotenoids: comparing extraction and chromatographic methods](#). *J of AOAC Int.* 2019; 102(4):1069-1079. doi: 10.5740/jaoacint.19-0017
- Dzakovich, M.P.**, Gómez, C., Ferruzzi, M.G., Mitchell, C.A. [Chemical and sensory properties of greenhouse tomatoes remain unchanged in response to red, blue, and far-red supplemental light from light emitting diodes](#). *Hort. Sci.* 2017; 52(12):1734-1741. doi: 10.21273/HORTSCI12469-17
- Dzakovich, M.P.**, Ferruzzi, M.G., Mitchell, C.A. [Manipulating sensory and phytochemical profiles of greenhouse tomatoes using environmentally relevant doses of ultraviolet radiation](#). *Ag. & Food Chem.* 2016; 64(36):6801-6808. doi: 10.1021/acs.jafc.6b02983
- Dzakovich, M.P.**, Gómez, C., Mitchell, C.A. [Tomatoes grown with light-emitting diodes or high-pressure sodium supplemental lights have similar fruit-quality attributes](#). *Hort. Sci.* 2015; 50(10):1498-1502. doi: 10.21273/HORTSCI.50.10.1498
- Mitchell, C.A., Burr, J.F., **Dzakovich, M.P.**, Gómez, C., Lopez, R., Hernández, R., Kubota, C., Currey, C.J., Meng, Q., Runkle, E.S., Bourget, C.M., Morrow, R.C., Both, A.J. [Light-Emitting diodes in horticulture](#). *Hort. Reviews.* 2015; 43(1):1-87. doi: 10.1002/9781119107781.ch01

Funded Proposals:

- Paape, T.D., Xu, W.W., Awika, J., **Dzakovich M.P (Co-I)**. Developing Early-Detection Tools to Screen Corn Germplasm for Drought Tolerance and Antioxidants. USDA-ARS Innovation Fund (\$25,000)
- Dzakovich, M.P. (PI)**. Ironing out the Details: Determining the Chemical Culprits of Poor Iron Bioavailability Associated with Spinach Consumption. Texas Children's Hospital Pediatric Pilot Award 69513-I. 07/2023 – 07/2024. (\$50,000)
- Dzakovich, M.P. (PI)**. Determining the Genetic Basis of Mineral and Carotenoid Bioaccessibility in Spinach. USDA-CRIS 3092-51000-061-01S. 04/2022 – 03/2024.
- Francis D.M. (PI), Clinton S.K. (Co-I), Cooperstone J.L. (Co-I), **Dzakovich M.P. (Co-I)**. Metabolomic and transcriptional responses to diets containing red or tangerine tomatoes. The Ohio State University Foods for Health (FFH) and Food Innovation Center (FIC) Seed Grant. 07/2017 – 06/2018. (\$25,000)
- Cooperstone J.L. (PI), Francis D.M. (Co-I), Jacobi S.A., Cichon M.J., **Dzakovich M.P. (Co-I)**. From bitter to better: exploring natural variation, bioavailability and tissue distribution of tomato alkaloids. Ohio Agricultural Research and Development Center, Early Career Investigator SEEDs grant. 04/01/2017 – 03/31/2019. (\$50,000)

Dzakovich, M.P. (PI). Metabolomic and Transcriptional Responses in Mice to Diets Containing Red or Tangerine Tomatoes. OARDC Graduate Student SEEDS Grant. 05/2017 – 05/2018. (\$5,000)

Select Presentations (* indicates presenter):

- Dzakovich, M.P.*** Nothing to Be Salty About: Modest Salinity Stress Improves Carotenoid Bioaccessibility from Spinach. NASA Human Research Program Conference. February 13-16, 2024. Galveston, TX (Poster)
- Hartman, J.L.* , **Dzakovich, M.P.**, Simons, C, Francis, D.F., and Cooperstone, J.L. Sensory Evaluation of Liking, Flavor Attributes, and Discriminability of Near-Isogenic Alkaloid-Diverse Tomatoes. Plant Sciences Symposium. March 30-31, 2023. Columbus, OH (Oral)
- Hartman, J.L.* , **Dzakovich, M.P.**, Simons, C, Francis, D.F., and Cooperstone, J.L. Metabolomics and Quantitative Analysis to Examine Metabolic Differences between Near-Isogenic High-Alkaloid Tomatoes. Ohio Mass Spectrometry and Metabolomics Symposium. October 12-13, 2022. Columbus, OH (Poster)
- Sholola, M.* , Goggans, M.L., **Dzakovich, M.P.**, Francis, D.F., Jacobi, S.K., and Cooperstone, J.L. A Mass Spectrometry-Based Approach for Quantification of Steroidal Alkaloids in Pig Plasma after Tomato Consumption. Ohio Mass Spectrometry and Metabolomics Symposium. October 12-13, 2022. Columbus, OH (Poster)
- Miller, J.L., Goggans, M.L., **Dzakovich, M.P.**, and Cooperstone, J.L.* Discovering biomarkers of tomato consumption using animal studies, human clinical trials, metabolomics, and targeted analyses. Metabolomics Society Annual Conference. June 19-23, 2022. Valencia, Spain (Oral)
- Dzakovich, M.P.***, Debelo, H., Albertsen, M.C., Che, P., Jones, T.J., Simon, M.K., Zhao, Z.Y., and Ferruzzi, M.G. Trait Stacking Simultaneously Enhances Mineral and Provitamin A Carotenoid Bioaccessibility in Biofortified *Sorghum bicolor*. Virtual International Conference on Carotenoids. April 12-14, 2022. (Oral)
- Dzakovich, M.P.***, Thomas-Ahner, J.M., Goggans, M.L., Clinton, S.K., Francis, D.M., Cooperstone, J.L. Dietary Tomato Phytochemicals Impact the Mouse Liver Transcriptome and Metabolome. Metabolomics Association of North America 2021. October 18-21, 2021. Columbus, OH (Oral)
- Dzakovich, M.P.***, Hartman, J.L., Francis, D.M., Cooperstone, J.L. Exploring Natural Variation in Tomato Steroidal Glycoalkaloids: Using Small Tomatoes to Answer Big Questions. Plant Sciences Symposium. March 27-28, 2020. Columbus, OH (Poster)
- Goggans, M.L.* , **Dzakovich, M.P.**, Francis, D.M., Jacobi, S.K., Cooperstone, J.L. Tomato Steroidal Glycoalkaloids are Absorbed and Metabolized in Pigs. Plant Sciences Symposium. March 27-28, 2020. Columbus, OH (Poster)
- Hartman, J.L.* , **Dzakovich, M.P.**, Francis, D.M., Cooperstone, J.L. Are steroidal glycoalkaloids imparting bitterness in tomato? Plant Sciences Symposium. March 27-28, 2020. Columbus, OH (Poster)
- Goggans, M.L.* , **Dzakovich, M.P.**, Francis, D.M., Jacobi, S.K., Cooperstone, J.L. Tomato Steroidal Glycoalkaloids are Absorbed, Metabolized, and Stored in Pigs. Ohio Mass Spectrometry and Metabolomics Symposium. October 1-2, 2019, Columbus, OH (Poster)
- Dzakovich, M.P.**, Lee, T.J., Goggans, M., Miller, J., Francis, D.M., Cooperstone, J.L.* Tomato Steroidal Glycoalkaloids: Potentially Bioactive Compounds with Human Health Benefits? Solanaceae 2019. September 15-19, 2019. Jerusalem, Israel (Oral)

- Dzakovich, M.P.***, Lee, T.J., Francis, D.M., Cooperstone, J.L. From Bitter to Better: Exploring Variation in Tomato Glycoalkaloids. Plant Sciences Symposium. March 29-30, 2019. Columbus, OH (Oral)
- Dzakovich, M.P.***, Orchard, C.J., Gas-Pascual, E., Sari, E.N., Riedl, K.M., Curley, R.W., Harrison, E.H., Francis, D.M., Cooperstone, J.L. Picking up the pieces: carotenoid cleavage products differ in tomatoes as a function of carotenoid biosynthesis. Horticulture and Crop Science Graduate Research Symposium. October 11-12, 2018. Wooster, OH (Oral; **1st place**)
- Teegarden M.D., **Dzakovich M.P.**, Francis D.M., Peterson D.G., Cooperstone J.L.* Using metabolomics to better understand secondary plant metabolites and their health benefits. International Horticulture Congress, VII International Symposium on Human Health Effects of Fruits and Vegetables, FAVHEALTH2018, August 12-16, 2018, Istanbul, Turkey (Oral)
- Cooperstone J.L.* **Dzakovich M.P.**, Novotny J.A., Clinton S.K., Thomas-Ahner J.M., Curley Jr. R.W., Schwartz S.J., Francis D.M., Harrison E.H. Insights on carotenoids, β -apocarotenoids and apolycopenoids in human plasma and mouse liver after tomato consumption. Gordon Research Conference – Carotenoids, June 17-22, 2018, Newry, ME.
- Dzakovich, M.P.***, Moran, N.E., Powell, R., Thomas-Ahner, J.M., Clinton, S.K., Francis, D.M., Cooperstone, J.L. Hepatic Carotenoids and Apocarotenoids Differ in Response to Red or Tangerine Tomato Consumption. Gordon Research Seminar – Carotenoids. June 16-17, 2018. Newry, ME (Oral)
- Dzakovich, M.P.***, Francis, D.M., Cooperstone J.L. From Bitter to Better: Exploring Natural Variation in Potentially Bioactive Tomato Glycoalkaloids. International Society of Horticultural Science Symposium on Processing Tomatoes. June 11-15, 2018. Athens, Greece (Poster; **1st place**)
- Dzakovich, M.P.***, Cooperstone, J.L., Riedl, K.M., Schwartz, S.J., Francis, D.M. Purée to Peaks in 15 Minutes: A Rapid Carotenoid Extraction and UHPLC-PDA Analysis Workflow for Tomato Breeding. National Association of Plant Breeders. August 2017. Davis, CA (Poster)
- Dzakovich, M.P.***, Gas-Pascual, E., De Jesus, S., Cooperstone, J.L., Riedl, K.M., Schwartz, S.J., Francis, D.M. [Alleles of tangerine Differentially Alter Carotenoid Profiles in Tomato Fruit](#). Plant and Animal Genome 25, January 2017. San Diego, CA (Poster)
- Dzakovich, M.P.***, Gas-Pascual, E., De Jesus, S., Cooperstone, J.L., Riedl, K.M., Schwartz, S.J., Francis, D.M. Alleles of *tangerine* Differentially Alter Carotenoid Profiles in Tomato Fruit. Graduate Research Retreat. October 2016. Wooster, OH (Poster, **2nd place**)
- Sari, E.N.* **Dzakovich, M.P.**, Francis, D.M. The effects of *CYC-B* introgression on cherry tomato fruit quality. National Association of Plant Breeders, August 2016. Raleigh, NC. (Oral)
- Dzakovich, M.P.***, Gas-Pascual, E., De Jesus, S., Cooperstone, J.L., Schwartz, S.J., Francis, D.M. Improving Human Health by Leveraging Natural Variation in Carotenoid Biosynthetic Genes. **Graduate Research Retreat. October 2015. Columbus, OH.** (Oral, **1st place**)
- Dzakovich, M.P.***, Gomez, C.V., Ferruzzi, M.G., Mitchell, C.A. Using Light to Manipulate the Nutritional and Sensory Properties of Greenhouse Tomatoes with Red, Blue, and Far-red Supplemental LEDs. American Society for Horticultural Science. August 2015. New Orleans, LA. (Oral)

Select Outreach Activities:

- CNRC Green Team (2022 – present)
 - Maintains public greenspaces in front of building and coordinates environmentally positive activities throughout the year.
- Breakfast of Science Champions “Why I Became a Scientist.” November 6th, 2019. Columbus, OH
 - Presented to 40 middle-school students from Columbus City Schools
- Pollinator Palooza “Painting with Pigments” activity. June 22nd, 2019. Columbus, OH.
- Color My World: Creating Paintings with Plant Pigments, COSI Farm Days. August 11th, 2018. Columbus, OH.
 - Taught children how to use plant extracts to create paintings and butterflies. Activity highlighted the pigment diversity and how some respond to changes in pH
- Co-designed methods class (HCS7806) with Dr. Leah McHale: “Using Multimedia to Communicate Science to the Public”. Spring, 2017.
 - Helped conceive course curriculum and objectives; coordinated many of the guest lecturers.
- [Citation Needed](#) (Community Events; 2017 – 2018)
 - Organized screening of film *Food Evolution* (300+ attendees), hosted Dr. Allison Van Eenennaam, and led discussion with audience and Dr. Van Eenennaam
 - Coordinated monthly coffee hours and film screenings where students discussed controversial topics in science and how to communicate them with the public
- [Citation Needed](#) (President; 2016 – 2017)
 - Presided over an executive board of 9 student members and 2 faculty members
 - Completed training and regulatory steps to make Citation Needed an official student organization with The Ohio State University
 - Coordinated monthly “coffee hours”
 - Coordinated visits of Dr. Cami Ryan, Dr. Paige Jarreau, and Dr. David Hughes
 - Planned visits of Dr. David Hughes (partnering with the Ohio Agricultural Council) and Dr. Wamwari Waichungo
 - Partially coordinated collaboration between the Columbus March for Science and Citation Needed
- College of Food, Agricultural, and Environmental Sciences Associate Dean of Research and Graduate Education Search Committee Member, 2018
- Horticulture and Crop Science Graduate / Food Science and Technology Discovery Themes Search Committee (January – August 2017)
 - Student member of a search committee seeking a plant biochemist with experience in metabolomics.
- Horticulture and Crop Science Graduate Research Retreat Co-Chair (April – October, 2016)
 - Coordinated a student board of 8 members to plan and execute a department-wide retreat featuring a poster competition, oral presentation competition, guest speaker, and multiple meals.