



ILENYS M. PÉREZ-DÍAZ, PHD  
RESEARCH MICROBIOLOGIST  
USDA -ARS Food Science & Market  
Quality and Handling Research Unit

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## RESEARCH PROGRAM OBJECTIVES

Developing microbiology-based technologies and solutions to improve the quality, safety, and value of vegetable products. Studying the underlying microbial interactions in vegetable fermentations to improve nutritional value and bioactivity. Learning the parallels among vegetable and human gut fermentations to augment understanding of the synergistic and antagonistic microbial interactions with potential application for vegetable production and human health.

## ACCOMPLISHED GOALS

Dr. Pérez-Díaz conducts original and independent research that has practical dimensions, while supervising staff members and providing training for post-doctoral fellows and graduate and undergraduate students. She develops vegetable fermentation processes without sodium chloride, cucumber acidification methods with reduced vinegar and salt content and without traditional preservatives, studies the causes of multiple cucumber fermentation microbial spoilages, develops starter cultures for pickling that meet Kosher guidelines and enhances proprietary technology to monitor the efficacy of food processing parameters.

## EDUCATION

### **Post-Doctoral Training (GS11) | Microbiologist with the USDA-ARS Food Science Research Unit, Raleigh, North Carolina, U. S. A.**

FEBRUARY 2005 TO NOVEMBER, 2005: Studied acid resistance of pathogenic *Escherichia coli* O157:H7 in acidified and fermented vegetables. Mentor: Dr. Fred Breidt and Dr. Roger McFeeters

### **M.S. and Ph.D. Combined Program in Microbiology | University of Wisconsin-Madison Campus**

1998-2005-CUM LAUDE: Dissertation Title: Citric acid utilization by the non-starter culture *Lactobacillus casei* in ripening cheese. Advisor: Dr. James L. Steele, Department of Food Science

### **B. S. in Microbiology | University of Puerto Rico-Mayagüez Campus**

1994-1998: SUMA CUM LAUDE

**High School Diploma | Residential Center for Educational Opportunities for Talented Students in Sciences and Maths, Mayagüez, Puerto Rico** (Boarding school for talented students from across the country that specializes in sciences and math. Students admitted into the school must pass the College Board Standardized Examination designed for admission to universities in the U. S. A.)  
1992-1994: GRADUATED WITH HONORS, 1<sup>ST</sup> RANK IN THE CLASS.



## RESEARCH EXPERIENCE

**Research Microbiologist, GS15 | USDA-ARS Food Science & Market Quality and Handling Research Unit, Raleigh, N. C., U. S. A.**  
2020-Present

**Research Microbiologist, GS14 | USDA-ARS Food Science Research Unit, Raleigh, N. C., U. S. A.**  
2015 – 2020

**Research Microbiologist, GS13 | USDA-ARS Food Science Research Unit, Raleigh, N. C., U. S. A.**  
2011 – 2015

**Research Microbiologist, GS12 | USDA-ARS Food Science Research Unit, Raleigh, N. C., U. S. A.**  
2005 – 2011

**Research Microbiologist, GS11 | USDA-ARS Food Science Research Unit, Raleigh, N. C., U. S. A.**  
2005

*United State Department of Agriculture (USDA)-Agricultural Research Service (ARS)-Food Science Research Unit's Mission: Develop new and enhanced methods for vegetable processing in the U. S. A.*

**USDA Assistant Professor | Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, N. C., U. S. A.**  
2006-2012

**USDA Associate Professor | Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, N. C., U. S. A.**  
2012-Present

*Role:* Research mentor for undergraduate students (30+), advisor for graduate students (10: 4 PhD, 4 M.S. and 2 Non-Thesis MS), supervisor for post-doctoral fellows (2), host visiting scholars (1), research collaborator (7 professors in the department), thesis committee member (7) and guest lecturer.

**Research Assistant | Department of Food Science, University of Wisconsin-Madison Campus, Wisconsin, U. S. A.**  
1998-2004: PhD dissertation research (described above).

**Undergraduate Summer Research Fellow | Summer Minority Program, Tufts University, Boston Massachusetts, U. S. A.**

SUMMER 1996: Construction of a recombinant plasmid for transformation and protein overexpression in *Escherichia coli*.

**Undergraduate Researcher | Minority Access for Research Career Program (MARC) at the University of Puerto Rico-Mayagüez Campus**

1996-1998: Isolated and identified *Vibrio parahaemolyticus* colonies from oysters and clams collected in the Caribbean waters and characterized the *tdh* conferring pathogenicity.

**Researcher in Training | Access to Careers and Education in Science and Math for High School Students at the Interamerican University –San Germán Campus, Puerto Rico**

1992-1994: Characterized the microbiota of blood and pork sausages using traditional culture-based methods and developed guidelines for the safe manufacture of the sausages.



## TEACHING EXPERIENCE

**FS481: Research Experience in Food Science | Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, North Carolina, U. S. A.**

SUMMER SESSION 2018: Developed the new course and beta tested for two years under FS495.

**FS495 Research Experience in Food Microbiology | Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, North Carolina, U. S. A.**

SUMMER SESSION 2012

**FS495 Research Experience in Food Science and Bioprocessing | Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, North Carolina, U. S. A.**

SUMMER SESSION 2011

**Guest Lecturer: FS505 Food Microbiology | Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, North Carolina, U. S. A.**

FALL SESSION 2011

**Guest Lecturer: FLS336: Business Spanish and FLS337 Spanish for Tourism | Department of Foreign Languages and Literatures, North Carolina State University, Raleigh, North Carolina, U. S. A.**

2010-2012

**Graduate Teaching Assistant: MB330: Medical Microbiology and Immunology | School of**

Medicine, University of Wisconsin-Madison, U. S. A.

2000

**Graduate Teaching Assistant: MB450: Diversity of Prokaryotes | Department of Bacteriology, University of Wisconsin-Madison, U. S. A.**

1999



## PEER REVIEW JOURNAL ARTICLES AND PATENTS (50<sup>+</sup>)

\*Italicized names correspond to staff members supervised by Dr. Pérez-Díaz.

Díaz-Muñiz, I. and Steele, J. L. Conditions required for citrate utilization during growth of *Lactobacillus casei* in chemically defined medium and Cheddar Cheese Extract. *Antonie van Leeuwenhoek*. 90(3):233-243. 2006.

Díaz-Muñiz, I., Dattatreya, B., *Budinich, M. F.*, Rankin, S. A. and Steele, J. L. *Lactobacillus casei* metabolic potential to utilize citrate as an energy source in ripening cheese: A bioinformatics approach. *J. Appl. Microbiol.* 101(4):872-882. 2006.

Makarova, K., Wolf, Y., Sorokin, A., Kooning, E., Mirkin, B., Grigoriev, I., Lou, Y., Richardson, P., Rohksar, D., Lucas,

S. M., Huang, K., Goodstein, D. M., Hawkins, T. H., Plengvidhya, V., Welker, D., Hughes, J., Goh, Y., Benson, A., Baldwin, K., Lee, J.-H., Díaz-Muñiz, I., *Dosti, B.*, *Smeianov, V.*, *Wechter, W.*, Barabote, R., Lorca, G., Barrangou, R., *Alterman, E.*, Ganesan, B., Yie, X., Rawsthorne, H., Tamir, D., Parker, C., Slesarev, A., Kozyavkin, S., Breidt, F., Broadbent, J., Hutkins, R., O'Sullivan, D., Steele, J. L., Yuksel, G., Saier, M., Klaenhammer, T. R., Weimer, B., and Mills, D. A. Comparative genomics of the lactic acid bacteria. *Proc. Nat. Aca. Sci.* 103(42):15611-15616. 2006.

Pérez-Díaz, I. M., Kelling, R. E., Hale, S., Breidt, F. and McFeeters, R. F. Lactobacilli and tartrazine as causative agents of red-color spoilage in cucumber pickle products. *J. Food Sci.* 72(7):M240-M245. 2007.

Pérez-Díaz, I. M., Truong, V. D., Webber, A. and McFeeters, R. F. Microbial growth and the effects of mild acidification and preservatives in refrigerated sweet potato puree. *J. Food Prot.* 71(3):639-642. 2008.

Pérez-Díaz, I. M., and McFeeters, R. F. Microbiological preservation of cucumbers for bulk storage using acetic acid and food preservatives. *J. Food Sci.* 73(6):M287-M291. 2008.

Pérez-Díaz, I. M. and McFeeters, R. F. Modification of azo dyes by lactic acid bacteria. *J. Appl. Microbiol.* 107:584-589. 2009.

*Olsen M.J.* and Pérez-Díaz, I. M. Influence of microbial growth on the redox potential of fermented cucumbers. *J. Food Sci.* 74(4): M149-153. 2009.

McFeeters R. F. and Pérez-Díaz I. M. Fermentation of cucumbers brined with calcium chloride instead of sodium chloride. *J. Food Sci.* 75(3):C291-C296. 2010.

Pérez-Díaz, I. M. and McFeeters, R. F. Preservation of acidified cucumbers with a natural preservative combination of fumaric acid and allyl isothiocyanate that target lactic acid bacteria and yeasts. *J. Food Sci.* 75(4):M204-208. 2010.

Pérez-Díaz, I. M. and McFeeters, R. F. Preparation of a *Lactobacillus plantarum* starter culture for cucumber fermentations that can meet kosher guidelines. *J. Food Sci.* 76(2):M120-M123. 2011.

Lu, H.J., Breidt, F., Pérez-Díaz, I. M. and Osborne, J. A. The antimicrobial effects of weak acids on the survival of *Escherichia coli* O157:H7 under anaerobic conditions. *J. Food Prot.* 6:893-898. 2011.

Pérez-Díaz, I. M. Preservation of acidified cucumbers with a combination of fumaric acid and cinnamaldehyde that target lactic acid bacteria and yeasts. *J. Food Sci.* 76(7):M473-M477. 2011.

Budinich, M. F., Pérez-Díaz, I. M., Cai, H., Smeianov, V. V., Broadbent, J. and Steele, J. L. Growth of *Lactobacillus paracasei* ATCC 334 in a cheese model system: A biochemical approach. *J. Dairy Sci.* 94 :5263–5277. 2011

Franco, W., Pérez-Díaz, I. M., Johanningsmeier, S. D. and McFeeters, R. F. Characteristics of spoilage-associated secondary cucumber fermentation. *Appl. Environ. Microbiol.* 78(4):1273-1284. 2012.

Johanningsmeier, S. D., Franco, W., Pérez Díaz, I. M. and McFeeters, R. F. Influence of sodium chloride, pH, and lactic acid bacteria on anaerobic lactic acid utilization during fermented cucumber spoilage. *J. Food Sci.* 77(7):M397-M404. 2012.

Franco, W. and Pérez-Díaz, I. M. Role of selected oxidative yeasts and bacteria in cucumber secondary fermentation associated with spoilage of the fermented fruit. *Food Microbiol.* 32:338-344. 2012.

Lu, Z., Pérez-Díaz, I. M., Hayes, J. S. and Breidt, F. Bacteriophage ecology in a commercial cucumber fermentation. *Appl. Environ. Microbiol.* 78(24):8571-8578. 2012.

Franco, W. and Pérez-Díaz, I. M. Development of a model system for the study of spoilage associated secondary cucumber fermentation during long term storage. *J. Food Sci.* 77(10):M586-M592. 2012.

Franco, W. and Pérez-Díaz, I. M. Microbial interactions associated with secondary cucumber fermentation. *J. Appl. Microbiol.* 114:161-172. 2012.

Lu, H. J., Breidt, F. and Pérez-Díaz, I. M. Development of an effective treatment for a 5-log reduction of *Escherichia coli* in refrigerated pickle products. *J. Food Sci.* 78(2):M264-M269. 2013.

Pérez-Díaz, I. M. Putative and unique gene sequence utilization for the design of species specific probes as modeled by *Lactobacillus plantarum*. *Curr. Microbiol.* 66:266-270. 2013.

Breidt, F., Medina-Pradas, E., Wafa, D., Pérez-Díaz, I. M., Franco, W., Huang, H., Johanningsmeier, S. D. and Kim, J. Characterization of cucumber fermentation spoilage bacteria by enrichment culture and 16S rDNA cloning. *J. Food Sci.* 78(3):M470-M476. 2013.

Pérez-Díaz, I. M. and Caldwell, J. Novel methods and compositions to evaluate and determine inactivation of hazardous biological materials. US Patent Application 61/876,425 USDA Docket 42.13. 2013.

Caldwell, J. M., Pérez-Díaz, I. M., Sandeep, K. P., Simunovic, J., Harris, K., Osborne, J. and Hassan, H. M. Mitochondrial DNA fragmentation as a molecular tool to monitor thermal processing of plant-derived, low-acid foods and biomaterials. *J. Food Sci.* 80(8):M1804-1814. DOI: 10.1111/1750-3841.12937. 2015.

Reina, L., Pérez-Díaz, I. M., Breidt, F., Azcarate-Peril, M., Medina, E. and Butz, N. Characterization of the microbial diversity in yacon spontaneous fermentation. *Int. J. Food Microbiol.* 203:35-40. DOI: 0.1016/j.ijfoodmicro.2015.03.007. 2015.

Caldwell, J. M., Pérez-Díaz, I. M., Harris, K., Hassan, H. H., Simunovic, J. and Sandeep, K. P. Mitochondrial DNA fragmentation as a molecular tool to monitor processing parameters in high acid, plant-derived foods. *J. Food Sci.* doi: 10.1111/1750-3841.13139. 2015.

Pérez-Díaz, I. M., McFeeters, R. F., Moeller, L., Johanningsmeier, S. D., Hayes, J., Fornea, D. S., Rosenberg, L., Gilbert, C., Custis, N., Beene, K. and Bass, D. Commercial scale cucumber fermentations brined with calcium chloride instead of sodium chloride. *J. Food Sci.* doi: 10.1111/1750-3841.13107. 2015.

Medina, E., Pérez-Díaz, I. M., Breidt, F., Hayes, J., Franco, W., Butz, N. and Azcarate-Peril, A. M. Bacterial ecology of fermented cucumber rising pH spoilage as determined by non-culture based methods. *J. Food Sci.* 81(1): M121-129. DOI: 10.1111/1750-3841.13158. 2015.

Caldwell, J. L., Pérez-Díaz, I. M., Harris G., Hendrix K., Sanders T. H., Mitochondrial DNA fragmentation to monitor safety and quality in roasted peanuts. *Peanut Science.* 43(2): 94-105. 2016.

Pérez-Díaz, I. M., Hayes, J. S., Medina-Pradas, E., Anekella, K., Daughtry, K. V., Dieck, S., Levi, M., Price, R., Butz, N., Lu, Z., Azcarate-Peril, M. Reassessment of the succession of lactic acid bacteria in commercial cucumber fermentations and physiological and genomic features associated with their dominance. *Food Microbiol.* 63: 217-227. DOI: 10.1016/j.fm.2016.11.025. 2017

Fan, S., Breidt, F., Price, R. E., Pérez-Díaz, I. M. Survival and growth of probiotic lactic acid bacteria in refrigerated pickle products. *J. Food Sci.* 82(1):167-173. 2017.

Diaz, J. T., Pérez-Díaz, I. M., Simunovic, J., Sandeep, K. P. Winterization strategies for bulk storage of pickles. *J. Food Eng.* DOI: 10.1016/j.jfoodeng.2017.03.027. 2017.

Zhai, Y., Pérez-Díaz, I. M. Fermentation cover brine reformulation for cucumber processing with low salt to reduce bloater defect. *J. Food Sci.*, 82(12):2987-2996. DOI: 10.1111/1750-3841.13945. 2017.

Diaz, J. T., Pérez-Díaz, I. M., Messer, N., Safferman, S. I. Physical properties of NaCl-free cucumber fermentation cover brine containing CaCl<sub>2</sub> and glycerin and apparent freezing injury of the brined

fruits. J. Food Process Preserv. DOI:10.1111/jfpp.13582. 2017.

Zhai, Y., Pérez-Díaz, I. M., Diaz, J., Lombardi, R. L., Connelly, L. E. Evaluation of the use of malic acid decarboxylase-deficient starter culture in NaCl-free cucumber fermentations to reduce bloater incidence. J. Appl. Microbiol. 124(1):197-208. DOI:10.1111/jam.13625. 2018.

Pérez-Díaz, I. M., Hayes, J. S., Medina, E., Webber, A. M., Butz, N., Dickey, A. N., Lu, Z., Azcarate-Peril, M. A. Assessment of the non-lactic acid bacteria microbiota in fresh cucumbers and commercially fermented cucumberpickles brined with 6% NaCl. Food Microbiol. 77:10-20. DOI: 10.1016/j.fm.2018.08.003. 2018.

Zhai, Y., Pérez-Díaz, I. M., Diaz, J. T. Viability of commercial cucumber fermentation without nitrogen or airpurging. Trends Food Sci. Technol. 81: 185-192. DOI: 10.1016/j.tifs.2018.05.017. 2018.

Zhai, Y., Pérez-Díaz, I. M., Diaz, J. T. Viability of commercial cucumber fermentation without nitrogen or air purging. Trends Food Sci. Technol. 81: 185-192. DOI: 10.1016/j.tifs.2018.05.017. 2018.

Franco, W., Pérez-Díaz, I.M., Connelly, L., Diaz, J.T. Isolation of Exopolysaccharide-Producing Yeast and Lactic Acid Bacteria from Quinoa (*Chenopodium quinoa*) Sourdough Fermentation. Foods 9, 337. 2020.

Pérez-Díaz, I. M., Fitria, R., Ravishankar, N., Dickey, A. N., Hayes, J., Campbell, K., Arritt, F. Modulation of the bacterial population in commercial cucumber fermentations by brining salt type. J. Appl. Microbiol. ISSN 1364-5072 doi:10.1111/jam.14597. 2020.

Ucar, R. A., Pérez-Díaz, I. M., Dean, L. L. Content of xylose, trehalose and L-citrulline in cucumber fermentations and utilization of such compounds by certain lactic acid bacteria. Food Microbiol. 91, 103454. 2020.

Zhai, Y., Pérez-Díaz, I. M. Contribution of *Leuconostocaceae* to CO<sub>2</sub>-mediated bloater defect in cucumber fermentation. Food Microbiol. 103536. 2020.

Pérez-Díaz, I. M., Connelly, L., Diaz, J., Franco, W. Spontaneous sourdough fermentation of quinoa flour varieties: Microbial and biochemical characterization. Foods 9(3):337 doi: 10.3390/foods9030337

Lu Z., Pérez-Díaz, I. M., Hayes, J., Breidt, F. 2020. Bacteriophages infecting gram-negative bacteria in a commercial cucumber fermentation. Front. Microbiol. 530069

Anekella, K., Pérez-Díaz, I. M. 2020. Characterization of robust *Lactobacillus plantarum* and *Lactobacillus pentosus* starter cultures for environmentally friendly low-salt cucumber fermentations. J. Food Sci. 85(10):3487-3497

Caldwell, J. and Pérez-Díaz, I. M. 2020. Methods and compositions to evaluate and determine inactivation of hazardous biological materials. US Patent 10,718,032 B2, USDA Docket 42.13.

Ucar, R. A., Pérez-Díaz, I. M., Dean, L. L. 2020. Gentiobiose and cellobiose content in fresh and fermenting cucumbers and utilization of such disaccharides by lactic acid bacteria in fermented cucumber juice medium. Food Sci Nutr. 8(11):5798-5810. DOI: 10.1002/fsn3.1830

Pérez-Díaz, I. M., Anekella, K., Johanningsmeier, S. D., Pagán-Medina, C., Arellano, C., Price, R., Sandoval-Montalvo, L., Daughtry, K. V., Borges, M., Bream, C., Connelly, L., Dieck, S. E., Levi, M. T., McMurtrie, E. K., Smith, R. E., Theora, J. C., Wendland, P., Gómez-Rodríguez, F., Arroyo-López, F. N. 2020. Biodiversity of *Lactobacillus plantarum* and *Lactobacillus pentosus* in commercial cucumber fermentations brined with 1.06 M (5.6%) sodium chloride (NaCl). *Food Microbiol.* 94: 103652. DOI: 10.1016/j.fm.2020.103652

Zhai, Y., Pérez-Díaz, I. M. 2021. Identification of potential causative agents of the CO<sub>2</sub>-mediated bloater defect in low salt cucumber fermentation. *Int. Food Microbiol. J.* 16(344): 109115. DOI: 10.1016/j.ijfoodmicro.2021.109115.



## PEER REVIEW JOURNAL ARTICLES SUBMITTED (2)

Pérez-Díaz, I. M., Johanningsmeier, S. D., Anekella, K., Arellano, C., Price, R., Daughtry, K. V., Borges, M., Bream, C., Connelly, L., Dieck, S. E., Levi, M., McMurtrie, E. K., Smith, R. E., Theora, J. C., and Wendland, P. Screening and selection of *Lactobacillus brevis* isolates to be used as adjunct cultures for commercial cucumber fermentation. *J. Food Sci. In Revision* 2020.

Zhai, Y., Pagán-Medina, C. G., Pérez-Díaz, I. M. Evaluation of *Enterobacteriaceae* indigenous to cucumber as causative agents of bloater defect during fermentation. *Int. Food Microbiol. J. In Revision*



## BOOK CHAPTERS (5)

Breidt, F., McFeeters, R. F., Díaz-Muñiz, I. Fermented Vegetables. *In: Doyle, M. P., Beuchat, L. R., editors. Food Microbiology: Fundamentals and Frontiers, 3<sup>rd</sup> ed. Washington, DC: ASM Press. p. 783-794. 2006.*

Pérez-Díaz, I. M., Breidt, F., Buescher, R. W., Arroyo-Lopez, F. N., Jimenez-Díaz, R., Bautista-Gallego, J., Garrido-Fernandez, A., Yoon, S. and Johanningsmeier, S. D. Fermented and Acidified Vegetables. *In: Pouch Downes F, ItoKA, editors. Compendium of Methods for the Microbiological Examination of Foods, 5th Ed. American Public Health Association. Chapter 51. 2015.*

Medina-Pradas, E., Pérez-Díaz, I. M., Garrido-Fernández, A., Arroyo-López, F. N. Review of vegetable fermentations with particular emphasis on processing modifications, microbial ecology, and spoilage. *In: Bevilacqua A, Rosaria Corbo M, Sinigaglia M, editors. The Microbiological Quality of Food. Cambridge, MA:Woodhead Publishing. p. 211-236. 2016.*

Pérez-Díaz, I. M., Altuntas, E. G., Juneja, V. J. Microbial Fermentation in Food Preservation. *In: Vijay, V. J., Dwivedi, H. P., Sofos, J., editors. Microbial Control and Food Preservation-Theory and Practice. New York City, NY, USA, Springer. p. 281-298. 2018.*

Pérez-Díaz I.M. Fermented Vegetables as Vectors for Relocation of Microbial Diversity from the



Environment to the Human Gut. In: Azcarate-Peril M., Arnold R., Bruno-Bárcena J. (eds) How Fermented Foods Feed a Healthy Gut Microbiota. Springer, Cham p.91-123. 2019. DOI: [https://doi.org/10.1007/978-3-030-28737-5\\_4](https://doi.org/10.1007/978-3-030-28737-5_4)

## POPULAR PUBLICATIONS (9)

Pickle Spoilage Culprit May Give the Environment a Helping Hand, ARS Agriculture Research magazine <http://www.ars.usda.gov/is/AR/archive/sep10/September2010.pdf>

Guidelines for producing a starter culture for cucumber fermentation, ARS Food Science Research Unit, 2010  
<http://www.ars.usda.gov/SP2UserFiles/Place/66451000/GuidelinesforthePreparationofaStarterCultureforCucumberFermentationTanks.pdf>

Starter Culture for Pickling Cucumbers, Orthodox Union monthly newsletters for rabbinic Representatives. 2010.  
<http://www.ars.usda.gov/SP2UserFiles/Place/66451000/TheDafHakashrusMonthlyNewsletter.pdf>

Pickle Spoilage Bacteria May Help the Environment, Food and Nutrition Research Briefs, January 2011 <http://www.ars.usda.gov/is/np/fnrb/2011/fnrb0111.htm>

OPEN/net – Food Safety live, statewide, call-in television program in Spanish  
[http://www.ncapt.tv/shows/041409\\_FoodSafety.html](http://www.ncapt.tv/shows/041409_FoodSafety.html)

Domesticated Microbes Flex Industrial Muscle <http://www.ars.usda.gov/is/pr/2006/061116.htm>

Hola NC Fox 50 television short video to encourage the hispanic youth to work towards their dream.

National Geographic Short Video: Can Science Create a Greener Pickle? García-Pardo, G. (producer), Carlson, K. (videographer & editor), McFeeters, R. F., Pérez-Díaz, I. M. and Turner, J.  
<http://video.nationalgeographic.com/video/news/140825-pickle-brine-vin.2014>.

Cool, There is water on Mars. But does it make good pickles? What would happen if briny Martian liquid met an Earthling cucumber? *In*: Atlas Obscura, Gastro Obscura. August 01, 2018 Laskow, S. (Pérez-Díaz, I. M., collaborator).

## POSTER PRESENTATIONS (65+)

Díaz Muñiz, I., Ríos Velázquez, C., Martínez, V. S. 1993. Isolation and Identification of the Microflora present in Pork and Blood Sausages. International Science and Engineering Fair, Biloxi Beach, Mississippi, USA & XXI Scientific Investigation Congress, San Juan, Puerto Rico

Díaz-Muñiz, I., Young, D., Ornston, N. 1997. Recovery of Genes from Environmental Bacteria by Natural Transformation of *Acinetobacter*. Third Annual Leadership Alliance Summer Research Symposium, New York University, New York, USA

Díaz-Muñiz, I., Dudley, E. G., Pederson, J., Steele, J. L. 2000. Citrate catabolism by *Lactobacillus zeae* and *Lactobacillus casei* and its Influence on Growth in Ripening Cheese. 101<sup>st</sup> American Society for Microbiology, Orlando, Florida, USA

Díaz-Muñiz, I., Dudley, E. G., Steele, J. L. 2001. OadA Purification from *Lactobacillus casei* ATCC334 and *Lactobacillus zeae* ATCC393. Microbiology Doctoral Training Program Seminar Series, University of Wisconsin, Madison, Wisconsin, USA

Díaz-Muñiz, I., Steele, J. L. 2003. Potential Energy Sources for *Lactobacillus casei* in ripening cheese. Microbiology Doctoral Training Program Seminar Series, Madison, Wisconsin, USA

Díaz-Muñiz, I., Steele, J. L. 2003. Citrate catabolism by *Lactobacillus casei* in Ripening Cheese: A Genomic Approach. 104<sup>th</sup> American Society for Microbiology General Meeting, New Orleans, Louisiana, USA & Rayper Symposium-University of Wisconsin, Madison, Wisconsin, USA

Díaz-Muñiz, I., Budinich, M. F., Dattatreya, B., Rankin, S. A., Steele, J. L. 2005. *Lactobacillus casei* Metabolic Potential to Utilize Citrate as an Energy Source in Ripening Cheese: A Genomic Approach. 8<sup>th</sup> Symposium on Lactic Acid Bacteria, Egmond aan Zee, The Netherlands

Díaz Muñiz, I., Ríos Velázquez, C., Martínez, V. S. 1994. A good manufacturing procedures guide for the confection of blood and pork sausages. National Scientific Fair, San Germán, Puerto Rico

Díaz-Muñiz, I., Chaparro, M. 1997. Correlation of Kanagawa plate reaction, *tdh* probe, and the urea hydrolysis test in *Vibrio parahaemolyticus* isolated from oyster and clams. American Chemical Society Junior Technical Meeting / 18<sup>th</sup> Puerto Rico Interdisciplinary Scientific Meeting & 98<sup>th</sup> American Society for Microbiology General Meeting, Atlanta, Georgia, USA & National Minority Research Symposium, New Orleans, Louisiana, USA & 1998

Díaz-Muñiz, I., Steele, J. L. 2002. Expression of the Putative Citrate Catabolism Cluster from *Lactobacillus casei*, and *Lactobacillus zeae*. Microbiology Doctoral Training Program Seminar Series, University of Wisconsin, Madison, Wisconsin, USA

Díaz-Muñiz, I., Steele, J. L. 2003. Expression of the Putative Citrate Catabolism Cluster from *Lactobacillus casei*, and *Lactobacillus zeae*. Committee for Institutional Cooperation-Women in Academia Meeting (Institutional Change to Enhance Success).

Breidt, F., Plengvidhya, V., Díaz-Muñiz, I., Chong, H. Y., Park, H. S. 2005. Analysis of the Completed Genome Sequence of *Leuconostoc mesenteroides*. 8<sup>th</sup> Symposium on Lactic Acid Bacteria, Egmond aan Zee, The Netherlands

Budinich, M. F., Díaz-Muñiz, I., Smeianov, V. V., Broadbent, J. R., Steele, J. L. 2005. Examining Growth of *Lactobacillus casei* ATCC334 in a System Modeling Ripening Cheddar Cheese. 8<sup>th</sup> Symposium on Lactic

Díaz-Muñiz, I., Steele, J. L. 2005. Limiting Galactose Requirement for Citrate Utilization by *Lactobacillus casei* is Anulled in Cheddar Cheese Extract. 8<sup>th</sup> Symposium on Lactic Acid Bacteria, Egmond aan Zee, The Netherlands

Díaz-Muñiz, I., R. E. Kelling, S. Hale, F. Breidt, and R. F. McFeeters. 2007. Lactobacilli and tartrazine as the causative agents of red colored spoilage in cucumber pickled products. 107<sup>th</sup> American Society for Microbiology General Meeting, Toronto, CA

Battle, K. L., Pérez-Díaz, I. M. 2007. Effect of preservatives in refrigerated cucumbers. Undergraduate Summer Research Symposium. North Carolina State University, Raleigh, NC, USA.

Pérez-Díaz, I. M., McFeeters, R. 2008. Salt-free preservation for non-fermented cucumbers with acetic acid and sodium benzoate. Institute of Food Technologists Annual Meeting, New Orleans, Louisiana, U. S. A

Franco, W., Pérez-Díaz, I. M. 2010. Characterization of Fermented Cucumber Spoilage and Identification of Potential Causative Agents. NC ASM Branch Meeting, East Carolina University, Greenville, NC, U. S. A.

Lu, H., Breidt, F., Pérez-Díaz, I. M. 2010. Developing effective treatment for 5-log reduction of *Escherichia coli* O157:H7 in refrigerated pickle products. NC ASM Branch Meeting, East Carolina University, Greenville, NC, U. S. A. & Tenth Annual Sigma Xi Research Conference, Raleigh, NC Winner of a special Food Safety and Security award and a medal for superior research poster presentation.

Pascua-Cubides I. T., Simunovic, J., Sandeep, K. P., Pérez-Díaz, I. M., Truong, V. D. 2011. Quality and consumer acceptance of continuous flow microwave processed tomato salsa. Institute of Food Technologists Annual Meeting, New Orleans, LA, U. S. A.

Acid Bacteria, Egmond aan Zee, The Netherlands

Holsinger, H., Díaz-Muñiz, I. 2006. Evaluation of the *Leuconoctoc mesenteroides* metabolic potential to utilized pyruvic acid and produced acetic acid. Undergraduate Summer Research Symposium. North Carolina State University, Raleigh, NC, U. S. A.

Budinich, M. F., Pérez-Díaz, I. M., Cai, H., Smeianov, V. V., Broadbent J., Steele, J. L. 2008. Growth of *Lactobacillus casei* ATCC 334 in a cheese model system: A genomic approach. 5<sup>th</sup> International Dairy Federation Symposium on Cheese Ripening, Bern, Switzerland

Pérez-Díaz, I. M. 2009. Putative unique gene approach for the design of species-specific probe as modeled by *Lactobacillus plantarum*. 109<sup>th</sup> American Society for Microbiology General Meeting, Philadelphia, PA, U. S. A.

Olsen, M. J., Franco, W., Pérez-Díaz, I. M. 2010. Redox potential measurements for cucumber fermentations and storage. 110<sup>th</sup> American Society for Microbiology General Meeting, San Diego, CA, U. S. A.

Lu, Z., Pérez-Díaz, I. M., Hayes, J., Breidt, F. 2010. Bacteriophage ecology in an industrial cucumber fermentation. First International Conference of Viruses in Microbes, Pasteur Institute, Paris, France

Lu, J., Pérez-Díaz, I. M., Hayes, J. S., Breidt, F. 2011. Diversity of Bacteriophages in a Commercial cucumber fermentation. 4<sup>th</sup> Congress of the European Microbiologists, Geneva, Switzerland & Institute of Food Technologists Annual Meeting, Las Vegas, NV, U. S. A.

Franco, W., Johanningsmeier, S. D., Pérez-Díaz, I. M., McFeeters, R. M. 2011. Lactic acid utilization by *Lactobacillus buchneri* in fermented cucumber spoilage. 10<sup>th</sup> Lactic Acid Bacteria Symposium, The Netherlands.

Daughtry K. V., Dieck S. E., Iwata S., Levi M. T., McMurtrie E. K., Smith Jr. R. E., Theora J. C., Johanningsmeier S. D. and Pérez-Díaz, I. M. 2012. Selection of Starter Culture(s) for Commercial Cucumber Preservation Using a Screening Design for Fermentation Potential and Antimicrobial Activity, Undergraduate Research Symposium, North Carolina State University, Raleigh, NC, U. S. A.

Daughtry, K. V., Pérez-Díaz, I. M., Johanningsmeier, S. D., Dieck, S. E., Iwata, S., Levi, M. T., McMurtrie, E. K., Smith, R. E. Jr., Theora, J. C. 2013. Selection of starter culture(s) for commercial cucumber preservation using a screening design for fermentation potential and antimicrobial activity. Institute of Food Technologist Annual Meeting, Chicago, IL, U. S. A.

Borges, M., Bream, C., Connelly, L., Wendland, P., Anekella, K., Johanningsmeier, S. D., Pérez-Díaz, I. M. 2013. Selection of starter culture(s) for commercial cucumber preservation in the midwest using a screening design for fermentation potential and antimicrobial activity. North Carolina State University Undergraduate Research Symposium, Raleigh, NC, U. S. A.

Pérez-Díaz I. M., Anekella, K. 2014. Identification and characterization of potential starter cultures for commercial low salt cucumber fermentation. Symposium of Lactic Acid Bacteria, Egmond aan Zee, The Netherlands.

Lombardi, R., Pérez-Díaz, I. M., Breidt, F. 2014. Development of malic acid deficient starter cultures for cucumber fermentations. Undergraduate

Franco, W., Pérez-Díaz, I. M. 2012. Bacterial and yeasts interactions in cucumber secondary fermentation. International Congress of Yeasts, Madison, WI & Institute of Food Technologists Annual Meeting, Las Vegas, NV, U. S. A.

Pérez-Díaz, I. M., Hayes, J. S., Lu, Z., Breidt, F. 2012. Diversity of lactic acid bacteria in fresh and commercially fermented cucumbers. Institute of Food Technologists General Meeting, Las Vegas, NV, U. S. A.

Pérez-Díaz, I. M., Johanningsmeier, S. D., Hayes, J. S., Fornea, D. S., Price, R. E. 2013. Salt-free and reduced salt preservation of fresh cucumbers with acetic acid and preservatives. Mount Olive Pickle Company and Marcatus QED, Mount Olive, NC, U.S.A.

Daughtry, K. V., Johanningsmeier, S. D., Pérez-Díaz, I. M. 2013. Inhibition of spoilage-associated lactic acid bacteria using selected preservatives. Institute of Food Technologist Annual Meeting, Chicago, IL, U. S. A. & North Carolina State University Undergraduate Research Symposium, Raleigh, NC, U. S. A.

Connelly, L., Franco, W., Pérez-Díaz, I. M. 2014. Characterization of the microbiota present in quinoa flour fermentation and evaluation of their ability to produce exopolysaccharides. Symposium of Lactic Acid Bacteria, Egmond aan Zee, The Netherlands.

Pérez-Díaz, I. M., Anekella, K. 2014. Characterization of starter culture candidates for commercial cucumber fermentation. Institute of Food Technologists Annual Meeting, New Orleans Morial Convention Center, New Orleans, LA, U. S. A.

Pérez-Díaz, I. M., Caldwell, J. 2014. Mitochondrial DNA fragmentation to monitor safety and quality in thermally processed,

Research Symposium, North Carolina State University, Raleigh, NC, U. S. A.

*Fan, S., Breidt, F., Pérez-Díaz, I. M.* 2015. Characterization of probiotic lactic acid bacteria for use in refrigerated pickle products. American Society for Microbiology National Meeting, New Orleans, LA, U. S. A.

*Anekella, K., Pérez-Díaz, I. M.* 2015. Identification and characterization of potential starter cultures for commercial low salt cucumber fermentation. Institute of Food Technologists Annual Meeting, Chicago, IL, U. S. A.

*Zhai, Y., Pérez-Díaz, I. M.* 2016. Strategies to reduce bloating incidence in cucumber fermentation brined with calcium chloride. North Carolina American Society for Microbiology Annual Meeting; Wilmington, NC, U. S. A.

*Ucar, R., Pérez-Díaz, I. M.* 2016. Profiling of the ability of selected lactic acid bacteria to utilize carbohydrates found to be present in cucumber fermentations. North Carolina American Society for Microbiology Annual Meeting, Wilmington, NC, U. S. A.

*Fitria, R., Pérez-Díaz, I. M.* 2016. Effect of starter cultures in completion of cucumber fermentation brined with 1.1% calcium chloride instead of sodium chloride for reduce environmental impact. North Carolina American Society for Microbiology Annual Meeting; Wilmington, NC, U. S. A.

*Scinto, S., Johanningsmeier, S., Conley Payton, S., Pérez-Díaz, I. M.* 2017. Converting end of shelf-life, surplus vegetables into value-added, fermented vegetable products. The Future of Food and Nutrition, Graduate Student Research Conference; Tufts University, Boston, MA, U. S. A.

fermented or stored plant products. Institute of Food Technologists Annual Meeting, New Orleans Morial Convention Center, New Orleans, LA, U. S. A.

*Medina-Pradas, E., Pérez-Díaz, I. M., Breidt, F., Hayes, J. S., Franco, W., Butz, N., Azcarate-Peril, A.* 2015. Bacterial ecology of secondary cucumber fermentation as determined by non-culture-based methods. American Society for Microbiology 115th General Meeting; New Orleans, LA, U. S. A.

*Riley, I., Johanningsmeier, S. D., Dean, L. L., Pérez Díaz, I. M., Mattison, C.* 2016. Biochemical changes and protein characterization during lactic acid fermentation of cashew nut extract and cucumber juice. North Carolina State University Undergraduate Research Symposium, Raleigh, NC, U. S. A.

*Cauley, S. M., Pérez-Díaz, I. M., Johanningsmeier, S. D.* 2016. Survival of lyophilized, probiotic *Lactobacillus plantarum* and *Pediococcus acidilactici* in refrigerated, acidified cucumbers. American Society for Microbiology Microbes 2016 Conference; Boston, MA, U. S. A.

*Pérez-Díaz, I. M.* 2016. Characterizing spoilage in cucumber fermentations. Institute of Food Technologists Annual Meeting; Chicago, IL, U. S. A.

*Zhai, K., Pérez-Díaz, I. M., Diaz, J.* 2017. Evaluation of strategies to reduce fermented cucumber bloating using the new and more sustainable sodium chloride free system supplemented with calcium chloride. Institute of Food Technologists Food Expo 2017 & Annual Meeting; Las Vegas, NV, U. S. A.

Zhai, Y., Pérez-Díaz, I. M., Johanningsmeier, S. D. 2018. Defining fermented cucumber damage induced by freezing. Graduate Students Research Symposium at the Jane S. McKimmon Center, NC State University, Raleigh, NC, U. S. A & Institute of Food Technologist Annual Meeting (IFT18), McCormick Center, Chicago, IL, U. S. A.

Ucar, R. A., Pérez-Díaz, I. M., Dean, L. L. 2018. Utilization of secondary energy sources by selected lactic acid bacteria, candidates for starter or adjunct cultures for commercial cucumber fermentations. Graduate Students Research Symposium at the Jane S. McKimmon Center, NC State University, Raleigh, NC, U. S. A. & American Society for Microbiology Annual Meeting Microbes 2018, Atlanta, GA, U. S. A.

Rothwell, M., Pérez-Díaz, I. M. 2019. Characterizing the impact in cucumber fruit size and inoculation level on the growth of *Enterobacteriaceae* in cucumber juice fermentation. Undergraduate and Graduate Students Summer Research Symposium, NC State University, Raleigh, NC.

St. Port, D. P., Pérez-Díaz, I. M. 2019. Identification of effective acidification methods for surplus vegetables using natural preservatives to reduce food waste. Undergraduate and Graduate Students Summer Research Symposium, NC State University, Raleigh, NC.

Zhai, Y., Pérez-Díaz, I. M., Pagán-Medina, C. G. 2020. Contribution of the *Enterobacteriaceae* and *Leuconostocaceae* indigenous to cucumber to CO<sub>2</sub>-mediated bloater defect in the fermented fruit. American Society for Microbiology, Microbes-2020, Chicago, Illinois, U. S. A.

Pérez-Díaz, I. M., Hayes, J. S., Medina, E., Webber, A., Butz, N., Dickey, A., Lu, Z., Azcarate-Peril, M. A. 2018. Assessment of the non-lactic acid bacteria microbiota in fresh cucumbers and commercially fermented cucumber pickles brined with 6% NaCl. American Society for Microbiology – Microbes 2018, Georgia World Center, Atlanta, GA, U. S. A.

Pérez-Díaz, I. M., Hayes, J. S., Medina-Pradas, E., Webber, A., Butz, N., Dickey, A., Lu, Z., Azcarate-Peril, M. A., 2018. Assessment of the aerobic microbiota in fresh cucumber and commercially fermented cucumber pickles brined with 6% NaCl. Microbes 2018, Atlanta, GA; U. S. A.

Zhai, Y., Pérez-Díaz, I. M., Pagán-Medina, C. G. 2019. Contribution of the *Enterobacteriaceae* and *Leuconostocaceae* indigenous to cucumber to carbon dioxide-mediated bloater defect in the fermented fruit. Institute of Food Technologists Annual Conference and Food Expo (IFT-19), 2019, Louisiana, New Orleans, U. S. A. **Award Winning Student Poster Presentation**

Fitria, R., Pérez-Díaz, I. M., Dickey, A. 2019. Modulation of the microbiota in commercial cucumber fermentations by brining salt type. American Society for Microbiology, Microbes-2019, San Francisco, CA, U. S. A.



## FUNDED INVITED PRESENTATIONS (50<sup>+</sup>)

Díaz-Muñiz, I., Dudley, E. G., Budinich, M. F., Smeianov, V. V., Dattatreya, B., Rankin, S. A., Steele, J. L. 2006. Using genomics to examine the metabolic potential of lactic acid bacteria in ripening cheese and fermented vegetables. Department of Food Science, North Carolina State University, Raleigh, North Carolina, U. S. A.

Pérez-Díaz, I. M., Kelling, R. E., Hale, S., Breidt, F., McFeeters, R. F. 2006. Cause of red-colored spoilage in brined cucumbers. Pickle Packers International, Inc. Spring Meeting, Durham, North Carolina, U. S. A.

Pérez-Díaz, I. M., Breidt, F. 2007. Good manufacturing procedures for acidified foods. Smuckers Foods Canadian subsidiary, Saint Katharine, Ontario, CA, U. S. A.

Pérez-Díaz, I. M. 2007. Role of lactic acid bacteria and FD & C yellow no. 5 in the development of red colored cucumber spoilage. Pickle Packers International Annual Meeting, Memphis, Tennessee, U. S. A.

Pérez-Díaz, I. M., McFeeters, R. F. 2007. Microbiology of non-fermented cucumbers preserved with potassium sorbate, sodium benzoate, or sulfite. Pickle Packers International Annual Meeting, Memphis, Tennessee, U. S. A.

Pérez-Díaz, I. M. 2008. Career development after participating in the Minority Access to Research Careers program, University of Puerto Rico-Mayagüez Campus, Department of Biology (Declined in 2005, but visited in August 2008).

Pérez-Díaz, I. M. 2009. New Natural Preservatives for Bulk Storage of Cucumbers. Pickle Packers International Annual Meeting-Pickling Cucumber Improvement Committee Section, Chicago, Illinois, U. S. A.

Pérez-Díaz, I. M., Noriega M., and Broden J. 2009. OPEN/net – Food Safety live, statewide, call-in television program in Spanish [http://www.ncapt.tv/shows/041409\\_FoodSafety.html](http://www.ncapt.tv/shows/041409_FoodSafety.html)

Pérez-Díaz, I. M. 2009. Current fermentation and preservation technologies, Latin America food biotechnology congress, Veracruz, Mexico. (Declined).

Pérez-Díaz, I. M. (panelist) 2010. Graduate studies decision making and program/school selection, 10<sup>th</sup> Annual Conference of Biomedical Research for Minority Students (ABRCMS), Charlotte, North Carolina, U. S. A.

Pérez-Díaz, I. M. (opening session moderator/speaker) 2010. 10<sup>th</sup> Annual Conference of Biomedical Research for Minority Students (ABRCMS), Charlotte, North Carolina, U. S. A.

Pérez-Díaz, I. M. (panelist) 2010. Career development and employment opportunities with the federal government. Symposium for graduate students and post-doctoral fellows, North Carolina Biotechnology Center, Research Triangle Park, NC, U. S. A.

Pérez-Díaz, I. M. 2010. Food Industry in the U. S. A. and Kosher Certification. FSL336: Spanish for Business. (Dictated in Spanish)

Pérez-Díaz, I. M. 2011. New understanding of fermentation tanks spoilage. Spring Meeting Pickle Packers International, Inc., Raleigh, North Carolina, U. S. A.

Pérez-Díaz, I. M. 2011. FSL337: Spanish for Tourism in the Hispanic World. FSL337: Food Safety Issues

While Traveling. (Dictated in Spanish)

Pérez-Díaz, I. M. 2011. Development of starter cultures for vegetable fermentations. Pickle Packers International, Inc. Annual Meeting, Las Vegas, Nevada.

Pérez-Díaz, I. M. 2011. Delivery of probiotics in fermented vegetables. Research Initiative for Scientific Enhancement Program at the Ponce School of Medicine, Ponce, Puerto Rico.

Pérez-Díaz, I. M. 2011. Delivery of probiotics in fermented vegetables. Agriculture and Biotechnology Center, Pontifical Catholic University, Ponce, Puerto Rico.

Pérez-Díaz, I. M. 2011. Minority undergraduate students preparation for a scientific career in the biomedical sciences. Ponce School of Medicine, Ponce, Puerto Rico.

Pérez-Díaz, I. M. 2011. Pickling 101 Workshop: Fundamentals of Commercial Cucumber Tanning. Employees training, Mount Olive Pickle Co., Raleigh, NC, U. S. A. & Gedney Pickles Co., Chaska, MN, U. S. A.

Pérez-Díaz, I. M., Hayes, J. S. 2011. Diversity of lactic acid bacteria in fresh and commercially fermented cucumbers. Pickle Packers International Annual Meeting, Las Vegas, Nevada, U. S. A. & 10<sup>th</sup> Lactic Acid Bacteria Symposium, The Netherlands.

Pérez-Díaz, I. M. (panelist) 2012. Microbiology of Fermented Vegetables, Fermentation Frenzy Workshop, Appalachian State University, Boone, North Carolina, U. S. A.

Pérez-Díaz, I. M. 2012. Sodium chloride free cucumber fermentations, Pickle Packers International Annual Meeting, New Orleans, Louisiana, U. S. A. (video conferencing due to imminent maternity).

Pérez-Díaz, I. M., Hayes, J. S., Steinberg, J., Anekella, K., Daughtry, K., Dieck, S., Levi, M., Price, R. 2013. An updated view of the commercial cucumber fermentation microbiota. Pickle Packers International, Chicago, IL, U. S. A.

Pérez-Díaz, I. M. 2013. Microbial ecology of commercial cucumber fermentations. Pickle Packers International, Inc., U. S. A.

Pérez-Díaz, I. M. 2013. Cucumber processing workshops: Advances on the technology for sodium chloride free cucumber fermentation. This was a Rijk Zwaan sponsored tour of the pickling industry in Germany, Ukraine, and Russia.

Johanningsmeier, S. D., Pérez-Díaz, I. M. 2014. Characterization and remediation of spent pickle brine. Pickle Packers International, Inc., Dearborn, Michigan, U. S. A.

Reina, L., Pérez-Díaz, I. M. 2014. Can yacon and cucumbers hang-out together? ...nutrition and tradition in a single jar. Pickle Packers International, Inc., Dearborn, Michigan, U. S. A.

Sandeep, K. P., J, Jossip, S, Sandeep, K. P., Pérez-Díaz, I. M. 2014. Continuous microwave processing: advantages for acidified products. Pickle Packers International, Inc., Dearborn, Michigan, U. S. A.



Pérez-Díaz, I. M., Johanningsmeier, S. D. 2014. Advances in the development of NaCl free cucumber fermentation-Part I. Pickle Packers International, Inc., Orlando, FL, U. S. A.

Pérez-Díaz, I. M., Johanningsmeier, S. D. 2014. Advances in the development of NaCl free cucumber Fermentation-Part II. Pickle Packers International, Inc., Fort Worth, TX, U. S. A.

Pérez-Díaz, I. M., Caldwell, J., Borges, M. H. 2014. Exploring the unimaginable: Forensic DNA testing for pickling. Pickle Packers International Annual Meeting, Orlando, FL, U. S. A.

Farkas, B., Kaufman, A., Pérez-Díaz, I. M., Johanningsmeier, S. D. 2014. Characterization and remediation of spent pickle brine. Pickle Packers International Spring Meeting, Dearborn, MI, U. S. A.

Reina, L., Pérez-Díaz, I. M., Breidt, F. 2014. Can yacon and cucumbers hang-out together?. ...Nutrition and tradition in a single jar. Pickle Packers International Spring Meeting, Dearborn, MI, U. S. A.

Pérez-Díaz, I. M., Johanningsmeier, S. D., Diaz-Isaya, J., Hayes, J. S., Conley-Payton, S. 2015. Research progress on cucumber fermentation brined with calcium chloride instead of sodium chloride. Pickle Packers International Spring Meeting; Baltimore, MA, U. S. A.

Pérez-Díaz, I. M. 2015. Advances in cucumber fermentation brined with  $\text{CaCl}_2$  instead of NaCl. Global Pickling Summit in Nunhems, The Netherlands; & Society for Applied Microbiology Summer Conference on Fermented Foods, Dublin, Ireland.

Pérez-Díaz, I. M. 2015. New technologies for vegetable preservation by acidification and fermentation. Institute of Food Technology Dogwood Fall Conference, Raleigh, NC, USA.

Pérez-Díaz, I. M., Johanningsmeier, S. D., Diaz-Isaya, J., Hayes, J. S., Conley-Payton, S. 2015. Research progress on cucumber fermentation brined with calcium chloride instead of sodium chloride. Pickle Packers International, Baltimore, MA, U. S. A.

Pérez-Díaz, I. M. 2016. Design of starter cultures for cucumber fermentation: new insights into the microbiology of Grandma's pickles. Pickle Packers International (PPI) Annual Meeting and Product Showcase, Charleston, SC, U. S. A.

Pérez-Díaz, I. M., Zhai, Y. 2016. On the way to an optimal NaCl free cucumber fermentation. Pickle Packers International (PPI) Annual Meeting and Product Showcase, Charleston, SC, U. S. A.

Diaz, J., Pérez Díaz, I. M., Safferman, S., Simunovic, J., Sandeep, K. P. 2016. Winterization of cucumber fermentation tanks. Pickle Packers International, Inc. Spring Meeting; Raleigh, NC, U. S. A.

Pérez Díaz, I. M. 2016. IFT16 Genomics Day: Characterizing Spoilage of Vegetable Fermentation. Institute

of Food Technologists Conference and Food Expo, Chicago, IL, U. S. A.

Pérez Díaz, I. M. 2016. Development of starter cultures for commercial cucumber fermentations brined with low salt. American Society for Microbiology Microbes 2016 Conference; Boston, MA, U. S. A.

Cauley, S. M., Pérez-Díaz, I. M., Johanningsmeier, S. D. 2018. Myths, facts & science-based developments to enable the production of probiotic pickles with beneficial effects for consumers. Pickle Packers International Spring Meeting 2018, Pittsburgh, PA, U. S. A.

Johanningsmeier, S. D., Cauley, S. M., Pérez-Díaz, I. M. 2018. Consumer acceptability of probiotic pickles. Pickle Packers International Spring Meeting, Pittsburgh, PA, U. S. A.

Zhai, Y., Pérez-Díaz, I. M., Johanningsmeier, S. D. 2018. Freezing damage of fermented cucumbers: What is it? Pickle Packers International Spring Meeting 2018, Pittsburgh, PA, U. S. A.

Pérez-Díaz, I. M. 2018. Translocation of microbial diversity from plants to the human gut by fermented vegetables. North Carolina Association of Nutritionists and Dietitians Regional Meeting in Winston-Salem 2018, Clemmons, NC, U. S. A.

Pérez-Díaz, I. M. 2019. Parallels among the microbial diversity in fermented vegetables & the human gut and potential applications in food and beverage products. IFT19: Microbiome Deep Dive, New Orleans, U. S. A.

Pérez-Díaz, I. M., Zhai, Y. 2019. Progress made towards the identification of the root cause for bloater defect and new interventions to enhance quality and reduce purging. Pickle Packers International Annual Meeting 2019, St. Petersburg, FL, U. S. A.

Pérez-Díaz, I. M. 2020. Bloater free and purging free cucumber fermentation. Pickle Packers International Board of Directors Annual Meeting 2020, Virtual Zoom Meeting.



## PROFESSIONAL ACTIVITIES

Member of the American Society for Microbiology, 1996 to present.

Member of the Institute of Food Technologists, 2005 to present.

Facilitator of the Annual Biomedical Research Conference for Minority Students, 2003, 2004, 2010 and 2011.

Participant, Lactic Acid Bacteria Genome Consortium Jamboree at the Joint Genome Institute, Oak Creek, California, U. S. A., 2003.

Ad-hoc Reviewer, peer review journals including: Journal of Food Science, Applied and Environmental Microbiology, Journal of Bacteriology, Journal of Microbiological Methods, Microbiology Journal, Journal of Applied Microbiology, Journal of Nutrition and Food Science, Journal of Food Fermentation and Processing and Food Control, 2005 to present.

Member, Graduate Studies Committee (Thesis Committees), Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, N. C., U. S. A., 2006 to present.

Adjunct member of the Pickle Packers International, Inc. Manufacturing and Technology Committee, 2006 to present.

Grader, Graduate Students Seminars, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, N. C., U. S. A., 2006 to present.

Instructor of the Acidified Foods Good Manufacturing Procedure School. This school provides training required by the U. S. A.-Food and Drug Administration regulations for supervisors of acidified foods processing lines, 2006 to 2016.

Mentor, undergraduate students through the USDA-ARS Summer Internship Program, the Alliance for Graduate Education and the Professoriate Program, the North Carolina State University-Zhejiang University Summer Exchange Program and the North Carolina State University Provost's Fellowship program. Four out of the five trainees are minority students based on race and gender, 2006 to 2008 and 2018 to 2019.

Organizer, Hispanic American Heritage Observance Annual Celebration, Raleigh Location of the Southeastern Area, USDA- Agricultural Research Service, 2006 to 2010, 2015 to 2016 and 2018 to 2019.

Consultant, microbiological evaluation of samples for several pickle-processing companies, guidance for handling / solving and or preventing several microbial spoilages on processed cucumber products, general pickle processing questions, 2006 to present.

Trainee, sensory evaluation of preserved and fermented cucumber pickle products in the Department of Food, Bioprocessing and Nutrition Sciences at North Carolina State University, Raleigh, N. C, U. S. A., 2007.

Member, Social and Recreation Committee, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, N. C., U. S. A., 2007 to 2010.

Mentor, of high school students and science teachers through the Math, Science and Education Network (MSEN) Summer Program at North Carolina State University, Raleigh, N. C., U. S. A., 2008 to

2011.

Member, Safety Committee, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, North Carolina, U. S. A., 2008 to 2009.

Assistant member of the graduate faculty, Department of Genomics Sciences, North Carolina State University, Raleigh, N. C., U. S. A., 2008 to present.

Member, Graduate Studies Committee, Department of Microbiology, North Carolina State University, Raleigh, N. C., U. S. A., 2008-2011 and 2018 to present.

Member Applied and Environmental Microbiology journal Editorial Board, 2008 to present.

Member, Commencement Committee, Department of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, N. C., U. S. A., 2009 to 2011.

Member of the review panel for the Minority Undergraduate Research Travel Awards to participate of the Annual Biomedical Research Conference sponsored by the American Society for Microbiology, 2010.

Co-organizer, Women Heritage Observance Annual Celebration, Raleigh Location of the Southeastern Area, USDA- Agriculture Research Service, 2010.

Mentor, job shadow experiences for several high school students, The Science House at North Carolina State University - Photonics Leadership Program, Raleigh, N. C., U. S. A., 2010 and 2011

Evaluator, Students Poster Presentations, Annual Biomedical Research Conference sponsored by the American Society for Microbiology, 2010.

Participant, Grant writing workshop sponsored by the American Society for Microbiology-Graduate Students and Post-Doctoral Fellows Summer Institute for Careers in Microbiology, University of Wisconsin, Madison, 2011.

Phi Tau Sigma Honorary Society at North Carolina State University Chapter member and alternate counselor (2011-2012), secretary (2013), vice-chair (2014), Chair (2015), member (2016-present), Raleigh, North Carolina, U. S. A.

Chairperson, Diversity Committee, Department of Food, Bioprocessing and Nutrition Sciences at North Carolina State University, Raleigh, N. C., U. S. A., 2011 to present.

Volunteer, Interfaith Food Shuttle-Backpack Buddies, Raleigh, North Carolina, U. S. A., 2011 to 2012.

Judge, multiple elementary schools in the State of North Carolina and the North Carolina State Science and Engineering Fair, Raleigh, N. C., U. S. A., 2011 to 2017.

Member of the Institute of Food Technology Annual Meeting Evaluation Committee for the review of the Biotechnology Division Technical Research Paper competition, 2012.

Member, North Carolina State University-College of Agriculture and Life Sciences Diversity and Inclusion Committee, 2013 to 2017.

Trainee, North Carolina State University Opening Doors workshop focused on factors defining diverse identity groups leading to the oppression of minorities. This was a 3-day off-site workshop sponsored by North Carolina State University for staff and students, 2014.

Judge for student poster presentations at the North Carolina Branch American Society for Microbiology Annual Meeting, 2015.

Panel member of the U. S. Department of Agriculture- Agricultural Research Service-Research Position Evaluation Program for the re-classification of peer positions, 2016 to present.

Graduate of the United State Department of Agriculture-Agricultural Research Service Virtual Leadership Training Program, 2016

Alternate Location Diversity Coordinator, United State Department of Agriculture-Agricultural Research Service Diversity, Inclusion and Engagement Committee, 2017 to 2019

Organizer, Chemistry of Fermentation Symposium Part I: Foods for the Southeast Region Meeting of the American Chemical Society (SERMACS), 2017.

Location Diversity Coordinator, United State Department of Agriculture-Agricultural Research Service Diversity, Inclusion and Engagement Committee, 2019 to 2020

Facilitator and panelist at the American Society for Microbiology sponsored Microbe Academy for Professional Development (MAPD), San Francisco, CA, U. S. A., June 2019



## **GRANTS AND AGREEMENTS (11)**

Breidt F., Pérez-Díaz I. M., Johanningsmeier S. D. (McFeeters R. F.) 2005 to present, Control of human pathogens associated with acidified produce foods. USDA-ARS National Program 108 – Food Safety CRIS project No. 6645-41420-006-00D, \$300,000.

Pérez-Díaz I. M., Truong D., Breidt F., Johanningsmeier S. D. (McFeeters R. F.) 2005 to present, Improved processes for cucumbers, cabbage, sweetpotatoes, and peppers to make high quality, nutritious products and reduce pollution. USDA-ARS National Program 306 - Quality and utilization of agricultural products CRIS project No. 6645-41000-007-00D, \$1,000,000.

McFeeters R. F., Breidt F., Pérez-Díaz I. M. (Co-PI's) 2006 to 2012, Research relevant to the improvement of pickling technologies, and the quality and safety of finished products, Pickle Packers

International, Inc., \$35,000 annually

Pérez-Díaz I. M., Breidt F., Johanningsmeier, S. D. (Co-PI's) 2013 to present, Research relevant to the improvement of pickling technologies, and the quality and safety of finished products, Pickle Packers International, Inc., \$35,000 annually

Pérez-Díaz I. M., Lu J., Breidt F. 2010 to 2013. Characterization of the bacterial and bacteriophage populations present in commercially fermented cucumbers. USDA-ARS and Kennesaw State University, Non-Funded Cooperative Agreement Project Number 6645-41000-007- 01N

Farkas B. (PI), Pérez-Díaz I. M. 2011 to 2012, Development of a filtration system for recycled cover brine solutions that can eliminate spoilage yeasts, Mount Olive Pickle Company, \$20,000.

Sandeep K. (PI), Simunovic J., Pérez-Díaz I. M., Harris, K. 2012 to 2015, Microbial Validation of Continuous Flow Microwave Processing of Acid and Low-Acid Particulate Foods, NIFA-AFRI \$495,000.

Pérez-Díaz I. M. (PI), Johanningsmeier S. D., Breidt F. 2011 to 2014, Process ready cucumber preservation with less than 2.4% acetic acid, USDA-ARS and Marcatus QED, 2012-2014, Non-Funded Cooperative Agreement Project Number 6645-41000-007-13N

Johanningsmeier S. D., Breidt F., Pérez-Díaz I. M. 2014 to 2019, Biochemical analyses of pickled vegetable samples to facilitate technology transfer and address industry needs. \$131,000.

Pérez-Díaz I. M. (PI), Johanningsmeier S. D. 2017 to 2019, Prediction chart for fermented cucumber damage induced by freezing and salting, Pickle Packers International, Inc. \$33,300.

Safferman, S., Knudson, W., Satish, J., Pérez-Díaz I. M., Johanningsmeier S. D, Breidt, F. 2017 to 2019, Agricultural waste diversion to high-value resources, \$90,000.

## ... AWARDS AND HONORS (20)

Recognition of Participation at the National Panasonic Academic Challenge, 1993.

Honor mention and recognition of participation at the International Scientific Fair for High School Students, 1993 and 1994. For designing a scientific research-based guideline of good manufacturing procedures to produce pork and blood sausages.

Boarding School for Educational Opportunities (CROEM) distinguish honor graduate, 1994.

Puertorrican Senatorial Scholarship awardee, 1995-1998.

Recipient of the Summer Minority Undergraduate Research Fellowship to conduct scientific research at Tufts University, Boston, Massachusetts, U. S. A., 1995.

Rosa Axtmeyer fellowship awardee, University of Puerto Rico, Mayagüez, Puerto Rico, 1995.

Honor Student B.S. Scholarship, Dean's Honored Lists, University of Puerto Rico, Mayagüez, Puerto Rico, 1996-1998

Selected to participate in the Minority Access for Research Careers Program sponsored by the National Institute of Health at the University of Puerto Rico, Mayagüez, Puerto Rico, 1996-1998.

Recipient of the American Society for Microbiology Minority Undergraduate Summer Research Fellowship to conduct scientific research at Yale University, New Haven, Connecticut, U. S. A., 1997.

Recipient of the Advanced Opportunity Fellowship sponsored by The Graduate School at the University of Wisconsin-Madison, U. S. A., 1998-2001.

Recipient of the 2001 Women in Science and Engineering Travel Grant sponsored by the Committee of Institutional Cooperation, University of Wisconsin-Madison, Wisconsin, U. S. A.

Recipient of the Robert D. Watkins Graduate Fellowship sponsored by the American Society for Microbiology to conduct microbiological research at the University of Wisconsin-Madison, Wisconsin, U. S. A., 2001-2005.

American Society for Microbiology General Meeting travel awards, 2003, 2004, and 2005

Annual Biomedical Research Conference for Minority Students travel awards, sponsored by the National Institute of Health, and managed by the American Society for Microbiology, 2004, 2005 and 2010.

Nominated as counselor for the Sigma Xi NC chapter, 2007.

Recipient of the Institute of Food Technologists Tanner Award, 2018 and 2019, in recognition of the most-cited paper published in 2016 and 2017 in the Food Microbiology and Safety Section of the Journal of Food Science. Papers titled: "Survival and growth of probiotic lactic acid bacteria in refrigerated pickle products"; and "Bacterial ecology of fermented cucumber rising pH spoilage as determined by non-culture-based methods".

Recipient of the USDA-ARS-SEA-CEEDIO Award in honor of Charles W. Beard, 2019 and 2020, presented to a medium size ARS location excelling in the efforts to engage employees, increase and maintain diversity and inclusion within the workforce and lead outreach activities. Dr. Pérez-Díaz is honored to lead the efforts at the location along with a strong committee of 6 very involved members and many other employees at the location that assist with the coordination of events and activities.

Recipient of the USDA-ARS-SEA Outreach, Diversity, and Equal Opportunity Award, 2021 in recognition of the commitment to excel in creating opportunities and developing solutions to increase employee satisfaction, recognition, retention, communication, diversification, inclusion and outreach efforts.

Updated: 03/19/2021