

Martha G. Rhoades

Research Manager, Environmental Chemistry and Toxicology of Xenobiotics
School of Natural Resources
Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln

OFFICE

102 Kiesselbach Crop Research, Lincoln, NE, USA 68583-0817
PH: +1-402-472-1633; FAX: +1-402-472-7904
Email: mrhoades1@unl.edu

EDUCATION

Ph.D. Environmental Toxicology
University of Nebraska Medical Center, 2010
Dissertation: *Nitrate and Atrazine Contaminated Drinking Water as Risk Factor for Non-Hodgkin Lymphoma in Nebraska*

B.S. Chemistry and Psychology
University of Nebraska-Lincoln (UNL), 2001

AS Medical Assistant
Omaha College of Health Careers, Omaha, NE, 1980

CURRENT AND PREVIOUS POSITIONS

7/2014 to present *Research Manager*, School of Natural Resources, UNL

7/2004 to 6/2014 *Laboratory Manager/Research Technologist*, School of Natural Resources, UNL

3/2001 to 4/2015 *Medical Transcriptionist*, Saint Elizabeth Regional Medical Center/Conifer Solutions, Lincoln, NE

10/2001-8/2003 *Analytical Chemist*, U.S. Army Corps of Engineers, Environmental Chemistry Branch, Omaha Facility, Omaha, NE

MAJOR RESEARCH INTERESTS

Drinking water quality (mixtures), gene-environment interaction, environmental toxicology/epidemiology, One Health.

REFEREED PUBLICATIONS

Joshi N, **Rhoades MG**, Bennett GD, Wells SM, Mirvish SS, Breitbach MJ, Shea PJ. Developmental abnormalities in chicken embryos exposed to *N*-nitrosoatrazine. *Journal of Toxicology and Environmental Health, Part A*. 2013: 76(17) 1015-1022. DOI: 10.1080/15287394.2013.831721

Rhoades MG, Meza JM, Beseler CL, Shea PJ, Kahle A, Vose JM, Eskridge, KM, Spalding RF Atrazine and nitrate in public drinking water supplies associated with non-Hodgkin lymphoma in Nebraska USA. *Environmental Health Insights* 2013:7 15-27. DOI:10.4137/EHIS10629.

Wei HR, **Rhoades MG**, Shea PJ. 2011. Formation, adsorption, and stability of *N*-nitrosoatrazine in water and soil. Ed. Benvenuto MA, Roberts-Kirchhoff ES, Murray MN, Garshott DM. Ch. 1, pp. 3-19 in *It's All in the Water: Studies of*

Materials and Conditions in Fresh and Salt Water Bodies. ACS Symposium Series 1086. American Chemical Society, Washington, DC.

In preparation:

Rhoades MG, et al. N-nitrosoatrazine and avian embryogenesis.

Rhoades MG, et al. Ecological study of the impact of nitrate and atrazine interaction on birth outcomes.

Rhoades MG, et al. Calculating salivary nitrate concentration at time of collection after storage of frozen samples.

BOOK CHAPTERS

Rhoades MG, Meza JM, Beseler CL, Shea PJ, Kahle A, Vose JM, Spalding ME, Spalding RF. Evaluating mixtures in drinking water supplies as risk factors for cancer: A case study of nitrate and atrazine. Chapter 2, p. 21-62 in *Epidemiology II - Theory, Research and Practice*. I-Concept Press, Ltd., Hong Kong 2015

INVITED ORAL PRESENTATIONS

Studying health impacts of agricultural chemicals in drinking water: There is no place like Nebraska. Lower Platte North NRD Groundwater Management Area Meeting. Schuyler, NE. 02/26/2020

Drinking Water and Public Health Research: The Birth Outcomes and Water (BOW) Study. 2019 Nebraska Water Conference. Norfolk, NE. October 9-10, 2019.

Agricultural mixtures in drinking water and health outcomes in Nebraska. Webinar, Nebraska Extension Educators. July 10, 2019.

Linkages between agricultural water pollution and health. Why we know so little. 2019 Water for Food Global Conference. Lincoln, NE. April 29-30, 2019

Birth Outcomes and Water. Midwest Rural Agriculture Safety and Health Conference. Council Bluffs, IA. November 27-29, 2018. New-Aaron MO, Rhoades MG.

Nebraska: A model for studying agricultural mixtures in drinking water and health outcomes. Bazile Groundwater Management Area Winter Open House. Osmond, NE. February 7, 2018.

Agricultural Mixtures in Drinking Water and Health Outcomes in Nebraska: Preliminary Findings and Research Opportunities. VA Nebraska and Northwest Iowa Research Seminar. Omaha, NE. October 13, 2017.

Non-Hodgkin Lymphoma, Birth Defects and Water Quality in Nebraska: Preliminary Findings and the Role of the Natural Resources Districts. Lower Elkhorn Natural Resources District Board meeting. Norfolk, NE. June 9, 2016.

Non-Hodgkin Lymphoma, Birth Defects and Water Quality in Nebraska: The Chicken or the Egg? Nebraska Water Center Spring Seminar Series. Lincoln, NE. January 13, 2016.

PRESENTATIONS

New-Aaron M, Roslan N, **Rhoades M**, Meza J, Eskridge K. Epidemiological and laboratory evidence of the embryotoxic effects of nitrate and atrazine interaction. American Public Health Association. November 2-6, 2019. Philadelphia, PA. Poster DOI: [10.13140/RG.2.2.21334.19526](https://doi.org/10.13140/RG.2.2.21334.19526)

- New-Aaron MO, **Rhoades MG**. Birth Outcomes and Water. Oral presentation. Midwest Rural Agriculture Safety and Health (MRASH) Conference. Council Bluffs, IA. November 27-29, 2018.
- New-Aaron MO, Roslan NF, Wallman JJ, **Rhoades MG**, Meza JL. *N*-nitrosoatrazine and Avian Embryogenesis. Poster. Daugherty Water for Food Institute Water Symposium October 24-26, 2018.
- New-Aaron M, Meza JL, Shea PJ, **Rhoades MG**. Birth Outcomes and Water: A Multidisciplinary Study. Poster. Central States Society of Toxicology meeting. Manhattan, KS. October 18-19, 2018.
- Roslan NF, New-Aaron M, **Rhoades M**, Eskridge K. Effect of *N*-nitrosoatrazine on Embryogenesis in Avian Embryos. Poster. Central States Society of Toxicology meeting. Manhattan, KS. October 18-19, 2018.
- New-Aaron M, **Rhoades M**, Meza JL, Wallman, J. Effect of Nitrosamine (NNAT) on Embryogenesis: Evidence from a Study Using Avian Embryos Exposed to NNAT. Poster. Midwest Biomedical Student Forum. Omaha, NE. February 17, 2018. http://digitalcommons.unmc.edu/coph_pres/9
- New-Aaron M, **Rhoades M**, Meza J, Wallman J. An analysis of correlation between agrichemical contaminated wells and birth defects in Nebraska. Poster. College of Public Health Student Research Conference. University of Nebraska Medical Center. Omaha, NE. April 5, 2017.
- Wallman JJ, Shea P, **Rhoades M**. Assessing *N*-Nitrosoatrazine toxicity in the chicken embryo. Poster. Undergraduate Student Poster Session and Creative Exhibition Research Fair. University of Nebraska-Lincoln. Lincoln, NE. April 4-5, 2017.
- Rhoades MG**, Howard LM, Steele CE, Shea PJ, Beseler CL, Raikes HH, Wallman JJ, Eskridge KM, Meza JL, New-Aaron MO, VanWormer E, Barnes-Josiah D, Gilmore TE, Rosenquist TH, Spalding RF. Risk of Adverse Birth Outcomes associated with wells testing positive for nitrate and nitrosatable agrichemical compounds in Nebraska: An ecological study. Poster. National Council for Science and the Environment National Conference and Global Forum on Science, Policy, and the Environment. Arlington, VA January 24-26, 2017.
- Rhoades MG**, Howard LM, Steele CE, Shea PJ, Raikes HH, VanWormer E, Travnicek DA, Eskridge KM, Spalding RF, Barnes-Josiah D, Rosenquist TH, Beseler CL. An ecological study evaluating the association between county birth defect rates and percent of wells testing positive for nitrate and nitrosatable agrichemical compounds in Nebraska, USA. Poster. Water for Food Global Conference. Lincoln, NE April 24-26, 2016.
- Shim J, Oh BT, **Rhoades M**, Shea PJ. Development of a Novel Composite Adsorbent for Removal of Aromatic Odor and Antibiotic Compounds from Water. Poster. NRD's 2016 Legislative Conference. Lincoln, NE. January 27, 2016.
- Shim J, **Rhoades M**, Shea PJ. Composite Alginate Beads for VOC and Heavy Metal(loid) Removal from Water. Poster. Daugherty Water for Food Institute Water Center Retreat, Kearney NE. October 7, 2015.
- Ma S, Shim J, **Rhoades M**, Shea PJ. Development and Testing of Novel Composite Alginate Beads for Removal of Aromatic Odor and Antibiotic Compounds from Water. Poster. UNL Summer Research Fair August 12, 2015.

- Gang X, Shim J, **Rhoades M**, Shea PJ. Materials for VOC Control in Feedlots: Preliminary Tests. Poster. UNL Summer Research Fair August 6, 2014.
- Shim J, **Rhoades M**, Shea P.J. Development of Hybrid Alginate Beads for Contaminant Removal and Metal Recovery from Water and Waste Water. Poster. OP-SETAC Conference, May 20, 2014
- Wei HR, **Rhoades MG**, Shea PJ Nitrosoatrazine Formation and Behavior in Water and Soil. 241st American Chemical Society National Meeting & Exposition. Anaheim, California March 30, 2011
- Rhoades MG**, Meza JM, Beseler CL, Vose JM, Shea PJ, Spalding RF Non-Hodgkin Lymphoma Risk in Nebraska and Drinking Water Contaminants: Atrazine and Nitrate. American Public Health Association 138th Annual Meeting. Denver, CO. November 10, 2010
- Joshi N, **Rhoades M**, Bennett GD, Wells SM, Shea PJ Assessing the Formation and Biological Significance of Selected Environmental Nitrosamines Using Model Systems. American Public Health Association 138th Annual Meeting. Denver, CO. November 10, 2010
- Rhoades MG** Agrochemical Contaminated Drinking Water and Risk of non-Hodgkin Lymphoma: Assessing the Exposure. College of Public Health Department of Environmental, Agriculture and Occupational Health Department and Student Seminar. University of Nebraska Medical Center, 2008
- Kim JS, Liu HY, **Rhoades MG**, Snow DD, Shea PJ. Nitrosamine Formation from Reaction of Pharmaceuticals and Pesticides with Nitrite and Chloramine. School of Natural Resources Research Colloquium. University of Nebraska Lincoln, 2007
- Kim JS, **Rhoades MG**, Shea PJ. Formation of *N*-Nitrosamines from Reaction of Pharmaceuticals with Nitrite and Chloramine. Society of Toxicology, Central States meeting, 2007
- Kim JS, **Rhoades MG**, Shea PJ. Formation and Fate of *N*-Nitrosamines From Pharmaceuticals at Physiological pH. American Chemical Society, National Meeting. 2006
- Rhoades MG**, Meza JL, Rogan EG, Exner ME, Spalding RF. A Spatial Model Exploring the Association of Groundwater Atrazine Concentration and the Incidence of Non-Hodgkin Lymphoma in Nebraska. Society of Environmental Toxicology and Chemistry, Ozark-Prairie Meeting, 2006.
- Kim JS, **Rhoades MG**, Shea PJ. *N*-Nitrosamine Formation from Ethambutol at the pH of the Human Stomach. Society of Environmental Toxicology and Chemistry, Ozark-Prairie Meeting, 2006.
- MacMillan DK, Hindemith AM, **Rhoades MG**. Isotope-Coded Affinity Tags and LC/MS for the Study of Human Hepatoma Cytochrome P450 Isozyme Response to 2,3,7,8-Tetrachlorodibenzo-*p*-Dioxin Exposure. American Society of Mass Spectrometry. 2002
- Rhoades MG**, Schnitker PS, MacMillan DK. Determination of Solubility and Stability of the Three Degradation Products of Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX). 37th American Chemical Society Midwest Regional Meeting. 2002
- MacMillan DK, Hindemith AM, **Rhoades MG**. LC/MS and Isotope Labeling to Evaluate Changes to Cytochrome P450 1A Expression After Exposure to 2,3,7,8-

Tetra-Chlorodibenzo-*P*-Dioxin. 37th Midwest Regional Meeting of the American Chemical Society. 2002

TEACHING

Forensic Toxicology – designed and developed. Offered fall semester. Primary instructor.	2018-present.
Environmental Health – designed and developed. Achievement-Centered Education (ACE) 8 (ethics) certified. Offered spring semester. Primary instructor.	2018-present.
Environmental Communication Skills Teaching assistant.	2016-present.
Water Resources Seminar Co-instructor.	2014-present.
Introduction to Agriculture and Natural Resource Systems Recitation instructor.	2012-2015
Toxins in the Environment Teaching assistant.	2011

MENTORING

Graduate

Krystal Davis – MPH Biostatistics, UNMC.	2019-present
Augustin Bakauon – MPH Biostatistics, UNMC.	2018-present
Moses New-Aaron – MPH Biostatistics, UNMC.	2016-2018
Jason Reed – Master of Applied Science, UNL.	2018-present
DaiTrang Le – MPH Epidemiology, UNMC	2018
Jessyka Johnson – MPH Public Health Practice, UNMC	2018

Undergraduate

Jaelyn Morehead – Biochemistry, UNL	2019-
Kaili Jorgens – Microbiology, UNL Undergraduate Creativity and Research Education (UCARE) pending	2019-
Ashley Thyges – Actuarial Science, UNL Undergraduate Creativity and Research Education (UCARE) pending	2019-
Emily Swanda – Microbiology, UNL Undergraduate Creativity and Research Education (UCARE)	2017-2019 2018-2019
Jenna Kacheroski – Forensic Science, UNL Undergraduate Creativity and Research Education (UCARE)	2018-2019
Deborah Marik – Environmental Studies. Senior Thesis reader.	2018
Courtney Dehm – Nutrition and Health Sciences, UNL	2017-2018
Ibraheem Hamzat – Microbiology, UNL	2017-2018
Jeffrey Wallman – Biochemistry, UNL Undergraduate Creativity and Research Education (UCARE) Honor's Thesis: <i>Assessing N-nitrosoatrazine Toxicity in the Chicken Embryo.</i>	2016-2017
Research Experiences for Undergraduates (REU): North West Agriculture and Forestry University (NWAUFU), Yangling, China Zuhui Huang, Yue Zheng	2017

Yu-nong Sun, Nai-yuan Jiang	2016
Sheng-nan Ma	2015
Xue Gang	2014

GRANTS

Funded

- November 1, 2017-June 30, 2020. Risk of Adverse Fetal Outcomes Associated with Maternal exposure to Nitrate and Nitrosatable Compounds in Drinking Water. \$19,600. Daugherty Water for Food Global Institute. Co-Principal Investigator.
- July 1, 2017-May 31, 2020. Risk of Adverse Fetal Outcomes Associated with Maternal exposure to Nitrate and Nitrosatable Compounds in Drinking Water. \$149,964. NU Food for Health Collaboration Initiative. Birth Outcomes and Water project information available at www.bow.unl.edu Collaborator/Project Leader.
- January 1, 2016 - March 31, 2017. Nitrate and Atrazine: Is the Mixture Toxic to the Developing Embryo? \$10,000. NU Foundation Research Council. Principal Investigator.
- August 11, 2014 - June 1, 2015. Non-point Source Pollution Control Program Cost Share. \$3500. Division of Conservation, Kansas Department of Agriculture. Landowner.

Pending/In Progress

- Genetic Alterations in Populations Chronically Exposed to Agrichemical Mixtures Through Drinking Water. National Institutes of Health. \$1,105,782 Virtual Consortium for Translational/Transdisciplinary Environmental Research (ViCTER). In review. Principal Investigator.
- Agrichemical Mixtures in Drinking Water and t(14;18)-defined subtypes of NHL. \$41,256. Nebraska Department of Health and Human Services. Cancer and Smoking Disease Research. LB506. In review. Principal Investigator.
- Grassland Reserve Program. US Department of Agriculture Conservation Reserve Program Contract-Environmental priority. Duration – 15 years. Landowner. In review.

SKILLS/PROFESSIONAL TRAINING

- Consortium for IRB Training Initiative in Human Subjects Protections (CITI)
- Microsoft Word, Excel, Access, and PowerPoint
- Statistical Package for Social Sciences (SPSS)
- High Performance Liquid Chromatography, Gas Chromatography/Mass Spectrometry, Liquid Chromatography/Mass Spectrometry for detection, quantification, identification and confirmation of organic and inorganic compounds in extracts from environmental and biological matrices.
- Knowledge of standard operating procedures and good laboratory practice for handling hazardous materials and radioisotopes.

Maintain inventory and laboratory records of procedures and data produced from experiments.
 Maintain laboratory equipment.
 Manage laboratory budgets.

PROFESSIONAL AFFILIATIONS/MEMBERSHIPS

American Chemical Society
 Society of Toxicology
 Society of Environmental Toxicology and Chemistry

JOURNAL REVIEWER

Environmental Health Insights Journal.	2015-present
International Journal of Environmental Research and Public Health.	2016-present
Sustainability.	2017-present
Water.	2017-present
Ecotoxicology and Environmental Safety.	2019-present

RESEARCH PROJECT REVIEWER

Society for Science and the Public Science Talent Search.	2014-present
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AWARDS

Writing Fellow Faculty-\$500	2019-2020
Achievement-Centered Education (ACE) Leadership Fellow-\$1000	2019-2020
Energy Conservation Award, Smith County Conservation District	2016
Ten Year Service Award, University of Nebraska-Lincoln	2015
National Register of Historic Places – James and Margaret Greer Farmstead. United States Senate	2011
Tuition remission and research support -\$2800. Center for Environmental Toxicology, University of Nebraska	2005-2007

PROFESSIONAL SERVICE

Faculty Search Committee-School of Natural Resources, UNL	2020
Faculty Search Committee, Forensic Science, UNL	2018
Staff Advisory and Professional Development Committee, School of Natural Resources, University of Nebraska Lincoln.	2010-2013
Nitrate Working Group	2018-
Prairie Streams Working Group	2019-
Crops and Water Working Group	2020-

COMMUNITY/CIVIL SERVICE

Member - Board of Directors, Cass County Rural Water District #2	2017-present
Precinct Election Official, Cass County, NE.	2005-present
Nebraska Alumni Association member.	2002-present
Chair – Finance Committee, First United Methodist Church, Waverly, NE.	2012-2015
Chair - Worship Committee, First United Methodist Church, Waverly, NE.	2006-2008
Blood donor-Lincoln Community Blood Bank	7 gal-present