# SAMUEL S. KIPROTICH

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## EDUCATION

**PhD** **Kansas State University**, Grain Science, and Industry — Anticipated May 2023
**Advisor:** Dr. Greg Aldrich
**Cumulative GPA**: 3.8
**Dissertation:** Application of non-thermal antimicrobial interventions to control foodborne pathogens in raw meat diets for companion animals.

**MS** **Iowa State University**, Food Science and Technology — December 2019
**Advisor**: Dr. Aubrey Mendonca
**Cumulative GPA**: 3.76/4.00
**Thesis**: "Control of Food-borne pathogens using Natural Antimicrobials"

**BS** **Makerere University, Uganda**, Food Science and Technology — February 2017
Graduated with a First Class, Honors Degree
***Research project:*** Sensory and Physico-Chemical properties of Extruded breakfast cereal from Sorghum.
***Advisor:*** Dr. Yusuf Byaruhanga

## RESEARCH EXPERIENCE

**Graduate Research Assistant- Kansas State University** — **Aug 2019- Present**

- **Research Projects**
  - Completed a study investigating the application of organic acidulants to control enteric foodborne pathogens in raw meat-based diets for companion animals.
  - Conducted and completed a study on the use of fermented whey powder to control *Aspergillus flavus* mold in semi-moist pet treats.
  - Currently preparing a grant proposal on the use of celery extracts as a natural antimicrobial to control foodborne pathogens in raw diets for companion animals.
  - Currently investigating the use of essential oils to control Salmonella in raw meat-based diets for dogs.
  - Currently running a hemp-oil shelf stability experiment for a company.
  - Managing the daily activities of a BSL-2 Microbiology Laboratory.

**Graduate Research Assistant- Iowa State University** **Aug 2017-Aug 2019**

- **Research Projects**
  - Completed a study investigating the tolerance of Long-Term Survival (LTS) phase of *Listeria monocytogenes* to an essential oil, cinnamaldehyde.
  - Conducted laboratory experiments to determine control, Survival, and sub-lethal injury of *Salmonella enterica* in chicken breast meat treated thyme oil.
  - Conducted Research on the resistance and tolerance of *Listeria monocytogenes* and to common industry sanitizers (QACs).
  - Developed a modified protocol for recovering, detecting, and enumerating sublethally injured populations of foodborne pathogens in food.

- **Industry related Projects** **Aug 2017-Aug 2019**
  - Designed and performed microbial analysis and shelf-life studies on six types of Fruit cocktail juices inoculated with *Salmonella enterica*, *Listeria monocytogenes* and *E. coli* O157:H7)
  - Designed and executed four microbial (two *Listeria* and two *Salmonella*) challenge studies on ready-to-eat meat, hotdogs and ground turkey.
  - Supervised four undergraduate researchers in the implementation of a Listeria, Salmonella and E. coli O157:H7 (STEC) challenge study in chicken salad. • Trained and supervised four undergraduate student researchers to date.
  - Maintaining inventory and ordering Laboratory supplies.

**Teaching Experience** **Jan 2019- May 2019**

***Graduate Teaching Assistant**, Iowa State University*

**Principles of Food Processing; FSHN 207**

- Currently assisting with instructing 16 students this semester.
- Supervision of undergraduate students during laboratory practical sessions.
- Assisted in developing and designing experiments for the class.
- Led discussions during laboratory practical sessions.
- Graded individual reports, exams and quizzes
- Actively held office hours for student consultations.
- Coordinated laboratory cleaning and ordered for supplies.
- Calibrated laboratory equipment prior to experiments.

**Visiting Scholar** **Sept-Oct. 2016**

*Department of Food Science and Human Nutrition, Iowa State University*

- Conducted a study to investigate antimicrobial properties of the Moringa plant (horseradish tree).
- Conducted experiments to determine minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) of an essential oil, isoeugenol.

**Volunteer- Grain Quality and Handling and Nutrition Education center June 2016 –April 2017**

*Iowa State University-Uganda Program, Kamuli, Uganda*

- Assisted nutrition program with interventions for infant malnutrition.
- Monitored moisture and aflatoxin development in corn.
- Prepared and designed grain handling SOPs.
- Supervised and managed four associate employees.
- Tracked and coordinated grain storage practices in three Primary (elementary) schools.
- Conducted grain handling extension service in three local communities teaching farmers about sustainable grain handling practices.

**Undergraduate Research Assistant** **Aug. 2015 - May 2016**

*Makerere University, Uganda*

- Developed a novel, chocolate-flavored breakfast cereal from whole grain Sorghum meal using the process of hot extrusion.
- Investigated the sensory and physico-chemical characteristics of extruded sorghum breakfast cereal made from whole grain sorghum.

## Grant Awards

1. Use of encapsulated organic acidulants as natural antimicrobials to control Salmonella in raw meat-based diets for dogs **($19,425.60)-** Balchem Corporation
2. Exploring Synergies for control of Salmonella enterica in model raw meat-based and freeze-dried pet diets using a combination of encapsulated and dry-plated organic acidulants **(~$100,000)**, proposal submitted to Balchem Corporation.

## RESEARCH PUBLICATIONS

- **Kiprotich, S.,** Mendonça, A., Dickson, J., Shaw, A., Thomas-Popo, E., White, S., ... & Ibrahim, S. A. (2020). Thyme Oil Enhances the Inactivation of Salmonella enterica on Raw

Chicken Breast Meat During Marination in Lemon Juice with Added Yucca schidigera Extract. *Frontiers in Nutrition*, *7*.

- **Kiprotich, S.,** Dhakal, J., Rasmussen, C., & Aldrich, C. G. (2021). Comparison of the Antifungal Efficacy of EverWild and Citrus Extracts Challenged Against Aspergillus flavus in Semi-Moist Pet Treats. *Kansas Agricultural Experiment Station Research Reports*, *7*(10), 16.
- **Kiprotich, S.,** Altom, E., Mason, R., & Aldrich, C. G. (2021). Application of Encapsulated Lactic Acid to Control the Growth and Multiplication of Salmonella enterica in Raw Meat-Based Diets for Dogs. *Kansas Agricultural Experiment Station Research Reports*, *7*(10), 15.
- Acuff, H. L., Dainton, A. N., Dhakal, J., **Kiprotich, S.,** & Aldrich, G. (2021). Sustainability and Pet Food: Is There a Role for Veterinarians? *Veterinary Clinics: Small Animal Practice*, *51*(3), 563-581.

**Manuscripts in preparation**

- **Samuel Kiprotich,** Greg Aldrich (2022). Application of non-thermal technologies to control proliferation and transmission of spoilage and pathogenic microorganisms in Raw meat-based diets for companion animals, a Review
- **Samuel Kiprotich**, Eric Altom, Robert Mason, Greg Aldrich (2022). Application of encapsulated and dry-plated organic acidulants to control *Salmonella enterica* in raw meat-based diets for dogs
- **Samuel Kiprotich**, Janak Dhakal, Cynthia Rasmussen, Greg Aldrich (2022). Assessing the antifungal efficacy of whey protein fermentate against *Aspergillus flavus* in semi-moist pet treats for dogs.
- **Samuel Kiprotich**, Aubrey Mendonca. 2022. Long-Term-Survival phase cells of *Listeria monocytogenes* exhibit increased tolerance to cinnamaldehyde in Apple juice. *(In preparation).*

**ABSTRACTS SUBMITTED**

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- **Samuel Kiprotich**, Eric Altom, Robert Mason, Greg Aldrich. Application of encapsulated and dry-plated organic acidulants to control *Salmonella enterica* in raw meat-based diets for dogs: **American Feed Industry Association (AFIA),** January 2022 Atlanta, Georgia, USA
- **Samuel Kiprotich,** Greg Aldrich**:** Application of non-thermal technologies to control spoilage and pathogenic bacteria in raw meat-based diets for companion animals: **Pet Food Forum (PFF).** May 2022
- **Samuel Kiprotich,** Janak Dhakal, Cynthia Rasmussen, Greg Aldrich: Citrus oil extract potentiates the antifungal efficacy of whey protein fermentate against Aspergillus flavus in semi-moist pet treats for dogs**: American Society of Animal Science**, June 2022

- **Samuel Kiprotich,** Janak Dhakal, Cynthia Rasmussen, Greg Aldrich: Assessing the antifungal efficacy of EverWild™ D01 against *Aspergillus flavus* in semi-moist pet treats: **American Society of Animal Science**, July 2021, Louiville, KY
- **Samuel Kiprotich**, Eric Altom, Robert Mason, Greg Aldrich: Control of *Salmonella enterica* using Lactic acid on inoculated raw meat-based dog food: **Pet Food Forum (PFF).** September 2021
- **Samuel Kiprotich**, Eric Altom, Robert Mason, Greg Aldrich: Evaluation of Encapsulated Citric and Lactic acids against *Salmonella enterica* in raw meat-based diets for dogs. **Arkansas Association for Food Protection (AAFP).** September 2021
- **Kiprotich, S**. (2019, July). Long-term Survival Phase Cells of Listeria monocytogenes Exhibit Increased Tolerance to Cinnamaldehyde in 0.85% Saline and Apple Juice. In *IAFP 2019 Annual Meeting*. IAFP.
- **Kiprotich, S.**, Mendonca, A., Coleman, S., & Thomas-Popo, E. (2018, July). Fate of Salmonella enterica on Raw Chicken Breast Meat Marinated in Lemon Juice with Added Thyme Oil and Yucca Extract. In *IAFP 2018 Annual Meeting*. IAFP.
- Jackson, Jealae, Alescia King, Hines Croshon, Armitra Jackson Davis, Aubrey Mendonca, Emalie Thomas-Popo, **Samuel Kiprotich**, and Salam Khan. "Yucca schidigera Extract Enhances the Antimicrobial Efficacy of Organic Acid Blends against Salmonella enterica in a Laboratory Broth System." In *IAFP European Symposium on Food Safety*. IAFP, 2018.
- A. Mendonca, S. Coleman, **Samuel Kiprotich,** E. Thomas-Popo: Antimicrobial Effectiveness of Eugenol or Geraniol Alone or Combined against *Escherichia coli* O157:H7 and *Salmonella enterica* in Pineapple Juice Held at 4°C: In *IAFP 2017 Annual Meeting*. IAFP

**MEETING PRESENTATIONS**

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**American Feed Industry Association (AFIA),** January 2022
Atlanta, Georgia, USA
Title:" Application of encapsulated and dry-plated organic acidulants to control Salmonella enterica in raw meat-based diets for dogs"
**Pet Food Forum (PFF).** September 2021
Kansas City, Missouri, USA
Title:" Control of *Salmonella enterica* using Lactic acid on inoculated raw meat-based dog food.**"**
**Arkansas Association for Food Protection (AAFP).** September 2021
Fayetteville, Arkansas, USA
Title: "Evaluation of Encapsulated Citric and Lactic acids against *Salmonella enterica* in raw meat-based diets for dogs."
Authors- **Samuel Kiprotich*, Eric** Altom, Robert Mason, Greg Aldrich

**International Association for Food Protection (IAFP).** Summer, 2018.
Salt Lake City, Utah, USA.
*Title:* "Fate of *Salmonella enterica* on Raw Chicken Breast Meat Marinated in Lemon Juice with Added Thyme Oil and Yucca Extract."
**Authors- Samuel Kiprotich*,** A. Mendonca, S. Coleman, E. Thomas-Popo **Presenter***

**SKILL SET**

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- Microbial analysis
- Designing and implementing Shelf-life studies.
- Designing and executing Microbial Challenge studies
- Product development.
- Sensory analysis
- Modified Atmospheric Packaging (MAP)
- High Pressure processing (HPP)
- Atmospheric Cold Plasma technology
- Data analysis and interpretation using JUMP and R
- Public speaking and presentation of scientific data/information
- Critiquing written documents including manuscripts, reports
- Designing research posters
- Computer proficiency (Microsoft Word, Excel, PowerPoint)

**PROFESSIONAL AND ORGANIZATION AFFILIATIONS**

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- Student member of International Association of Food Protection (IAFP).
- African Continental Association for Food Protection (ACAFP)
- Member of Phi Tau Sigma, Honors association of Food Science and technology.
- Member of College of Human Sciences Dean's Student Advisory Council
- Member of Food Science Club
- Member of the Food Product Development Club

**AWARDS AND HONORS**

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- Oral presentation, 1st place winner 2021, Grain Science symposium.
- 3-minute project presentation, 2nd place winner 2021, Pet Food Expo.
- Oral poster presentation, 2nd place winner 2021, AAFP conference.
- 2018 Global Food Solutions Challenge, first place, won $5,000 for project development.

(Team consisted of graduate students **S. Kiprotich,** E. Nsamba and M. Sesuronjogi)

- Net Impact fellow for Race and Equality, 2018-2019.
- Graduated with First Class Bachelor's degree in 2017.