



# Efforts by the Rendering & Pet Food Industries & Scientists Including the New Pet Food Alliance

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# Presentation Overview



- **History:**  
How the Pet Food Alliance came to be?
- **Structure and Initiatives of the Alliance**
- **Work to date**
- **Future plans/actions**



# Fats and Protein Research Foundation Mission

- **Fund research to help ensure a strong future for rendering industry and industry partners**
  - **Enhance current uses of rendered products**
  - **Improve rendering process**
  - **Develop novel applications**
- **Previous FPRF research funding → significant advances in industry**
- **Need to enhance and develop additional research relationships**
  - **Develop collaborative relationships with pet food industry**
  - **Increase funding resources**
  - **Expanding ideas**



# Alliance for Research and Innovation in the Rendering and Pet Food Industries

Relies on:

**Transdisciplinary** collaboration & participation

- pet food
- meat industry
- rendering industries
- researchers
- others: antioxidant suppliers, analytical labs and methods, ingredient suppliers (lactic acid)



- ***Collaboratively*** identify research challenges
- Discuss ***realistic and implementable solutions***
- ***Explore novel funding mechanisms***



# Inaugural Meeting at Colorado State University May 2017

## Stakeholders:

Darling, Nestle Purina, Seaboard, Tyson Foods, Diamond Pet Foods, Sanimax, Pilgrim's Pride, CFS North America, Corbion, Pet Food Institute, Smithfield, Mississippi State University, Iowa State University, Clemson

## Primary goals:

- *Extend and build networks*
- *Identify research challenges*
- *Discuss research priorities*



# Spring 2017: Identifying Research Challenges

## Identify challenges for each sector:

### *Packing Industry Challenges:*

- *Perception of Raw Ingredient Quality*
- *Oxidation Testing- Identifying New Markers*

### *Pet Food Industry Challenges:*

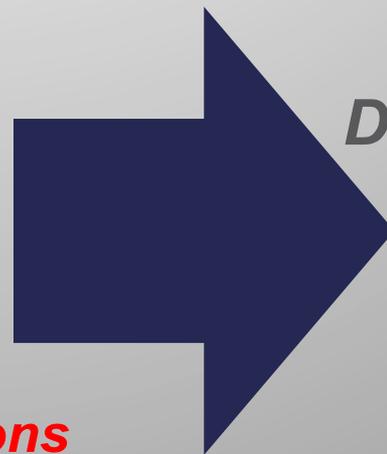
- *Pathogen Free Tallow*
- *Relative Risk of Salmonella*

### *Rendering Industry Challenges:*

- *Antioxidant Efficacy*
- *Meeting Near Food-Grade Regulations*

### *Academia Challenges:*

- *Research Funding*
- *Lack of understanding of industry problems*



*Develop Strategic  
Initiatives in  
Small Groups*

# Small Group Strategic Initiatives Were Developed



- **Sustainability of Rendering Working Group**
- **Public Perception Working Group**
- **Oxidation Working Group**
- ***Salmonella* and Product Safety Working Group**

# Fall 2017 Meeting at Colorado State University

## Meeting Priorities:

- Increase industry representation
- Refine strategic initiatives for the 4 working groups
- Generate Action Items



Sponsored by the Fats and Protein Research Foundation

## Attendees

Building networks is one of the primary goals of the Alliance—as such, attendee lists will be provided at the conclusion of the meeting



# Summer 2018 Meeting in Kansas City

100 attendees

## Meeting Priorities:

- Increase industry representation
- Focus efforts of working groups
- Utilize Alliance network to accomplish working group goals
- Identify new funding mechanisms



# January 2019 Meeting

- 85 Attendees
- Grown over 450%



# **Sustainability & Consumer Perception Working Group**

- **Work on development of website to educate consumers, explore “Mo Knows” created by Sarah Hubler and Dr. George Collings**
- **Reinforce development of internship program|**
- **Continue sustainability work performed at Iowa State will be highlighted on new NRA website and new PFA website.**
- **Plan to begin literature database for rendering and pet food**



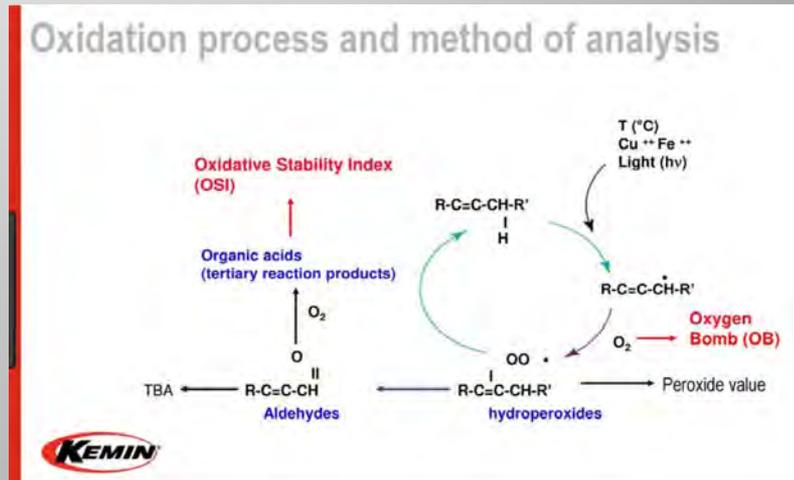
# Oxidation and Product Quality Working Group

## List of Priorities:

1. Check Sample Program
2. Representative Sampling
3. Database
4. Rendering Best Practices
5. Stability Future
6. Methodology - Extraction

## 5 Sub Working Groups:

- Check Sample Program
- Representative Sampling/Best Practices
- Rendering Best Practices
- Methodology (Current/Future)
- Database



# Salmonella and Product Safety Working Group

- **Drafted Bulk Fat Transportation Survey**
  - *Initially released October 24<sup>th</sup> by a 3<sup>rd</sup> party email*
  - *Will be released again next month*
- **Non-pathogen safety challenges**
  - *Foreign materials: identify training opportunities for plant employees to aid in development of training videos and materials*
- **Review pre-proposals submitted to hazard reduction RFP**
  - *6 research proposals received and under review with reviews by March 15, 2019*
- **Revise 2019 RFP to solicit research involving microbiome-based investigations of rendering and pet food industries**



# ***Research proposals received & under review:***

- **The effects of chemical treatments and different levels of fat and unsaturation on *Salmonella* species in rendered animal fats and oils.**
- **Piloting Silver Magnetic Nanoparticles to Eliminate *Salmonella* in Rendered Poultry Fat.**
- **Synergistic effect between UV-A and antimicrobials to inactivate *Salmonella spp.* on animal fats**
- **A potassium sorbate and sodium acid sulfate antimicrobial mix on mitigation of *Salmonella spp.* on pet food**
- **Thermal inactivation of *Salmonella* in rendered animal fats and subsequent use of dry sanitation to remove microbial hazards on pet food processing equipment**
- **Assessing Factors Affecting *Salmonella* in Beef Tallow and CWG**

# Progress Thus Far....and Future Steps



- **Since its inception in 2017:**
  - Pet Food Alliance has grown over 450%
  - From 30 to over 145 members representing more than 50 companies across the pet food, rendering, and meat industries.

## **Next Meeting – New Format:**

- **Scientific Symposium Format**
- **Symposia based on Working Group Priorities**
- **Registration costs used to fund research**

**June 26-28, 2019 in Denver, CO**

**<http://fprfalliance.agsci.colostate.edu>**

# Determine the location and influence of physical characteristics on *Salmonella* in poultry fat intended for pet food use.



- **Principle Investigators:**

Dr. Jennifer Martin & Dr. Dale Woerner Colorado State University

- **Purpose:**

Enhance understanding of distribution within and influence of physical and environmental parameters on populations of *Salmonella* within rendered poultry fat.

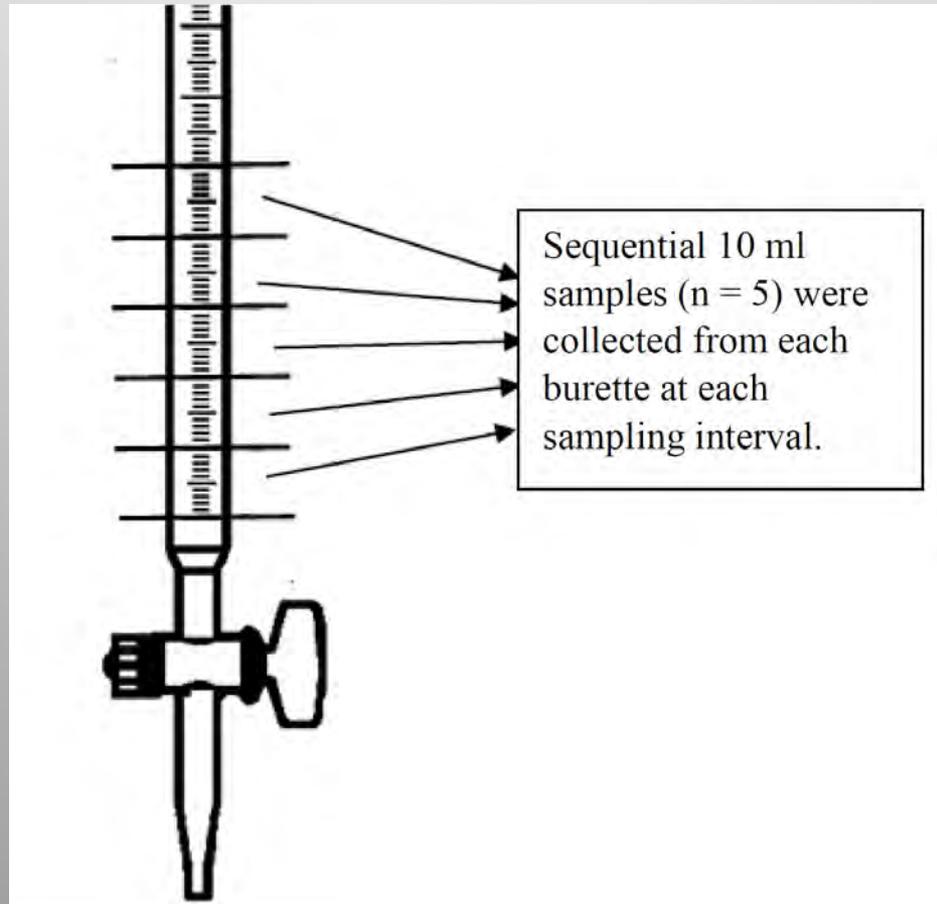
# Study Objective 1 of 3



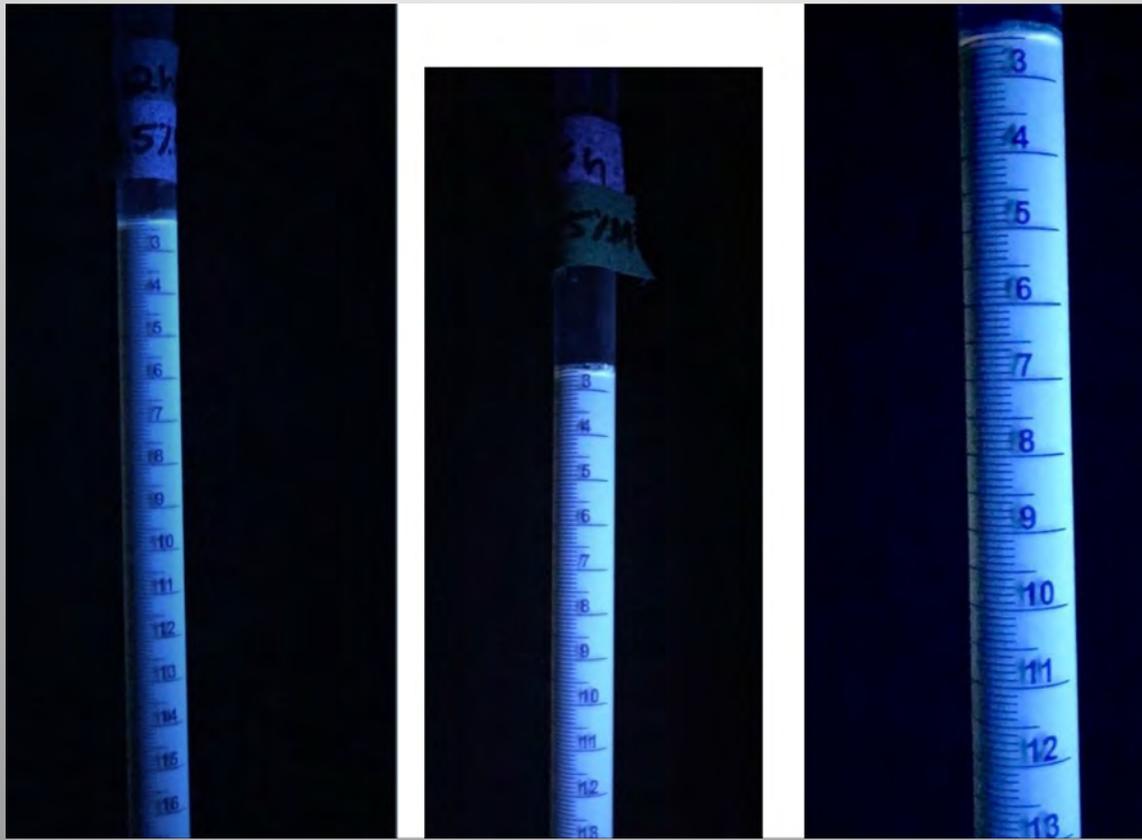
- **Objectives:**

- (i) Utilize fluorescently-tagged *Salmonella* to assess the distribution of *Salmonella* in a rendered fat matrix.
- In Study I(a), a green fluorescent protein (GFP)-expressing strain of *Salmonella* Typhimurium was used to visually and microbiologically map the organism within warmed (45°C) poultry fat formulations comprised of a low impurity level (0.2%) and three moisture contents (low: 0.5%; medium: 2.2%; high: 4.5%).

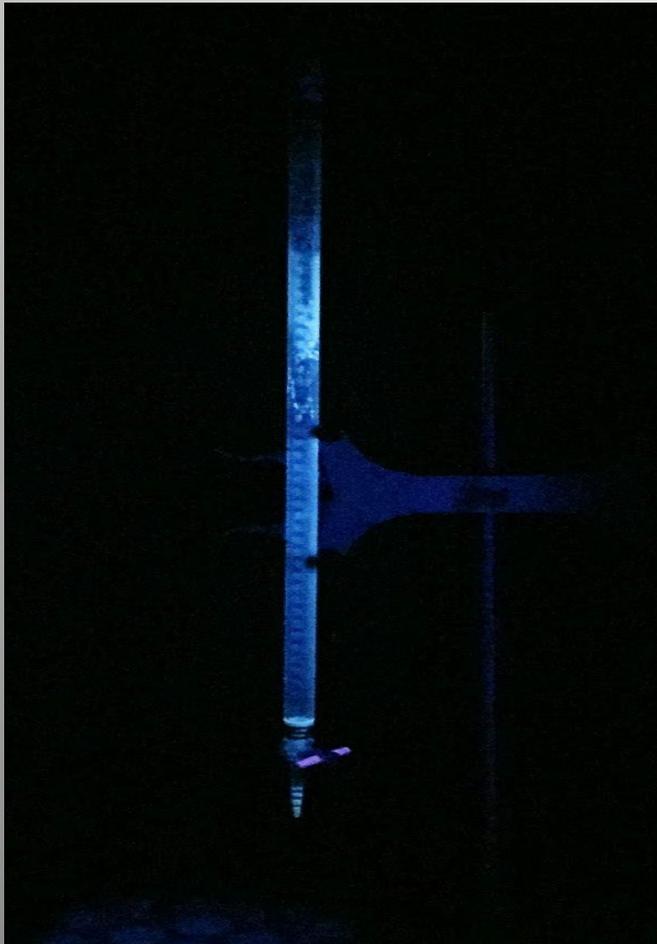
# Microbiological sampling schematic for poultry fat at five sampling intervals



# Photographs of burettes after inoculation. Fluorescence was noted at the point of inoculation



**Photographs of burettes after sampling was completed. Fluorescence was noted along the sides of the empty burettes.**



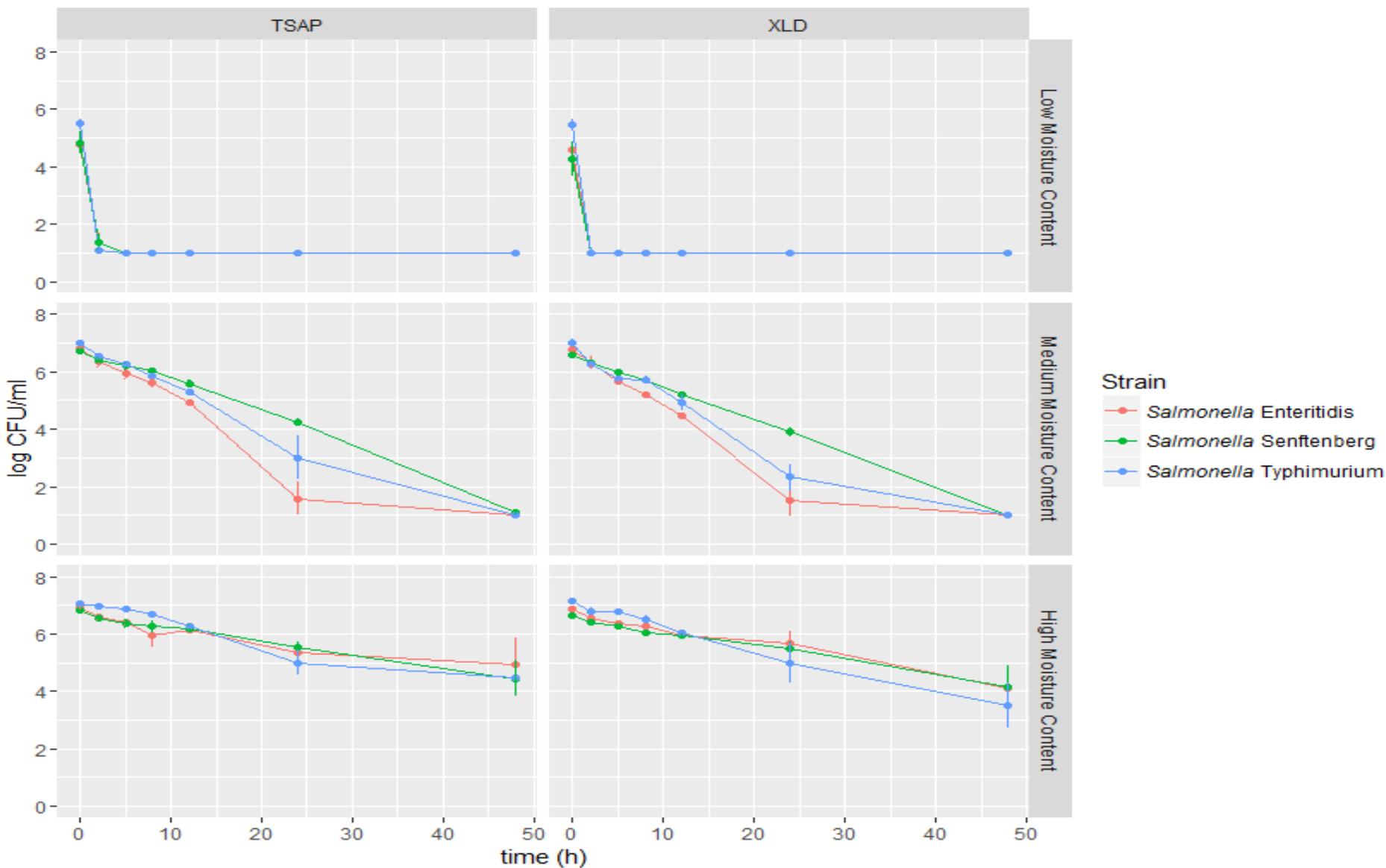
# Study Objectives 2 and 3



- **Objectives:**

- (ii) **Assess the influence of post-inoculation time and moisture content on the distribution of fluorescently-tagged Salmonella in rendered poultry fat.**
- (iii) **Assess the influence of post-inoculation time and physical parameters (i.e., impurity level and moisture content) on the survival of three Salmonella serotype strains in rendered poultry fat stored at 25° C or 45° C.**

# *Salmonella* in 1.0% impurity level poultry fat incubated at 45°C for 48 h.



# Study Conclusions:

Colorado  
State  
University



- Control of moisture content, temperature, impurity level and water activity is important for controlling survival of *Salmonella* spp. in poultry fat
- Lower impurity levels of fat were not better at controlling survival of *Salmonella*.
- Storage of fat with medium or high moisture content at 25°C allowed survival of *Salmonella*, and permitted growth at a high impurity level, high moisture content and high water activity
- Low impurity fat with low moisture content that is stored at a high temperature 45°C for a period of time would effectively control *Salmonella* contamination in poultry fat.
- Burette portion of the study resulted in the visual observation of fluorescently-tagged *Salmonella* Typhimurium on the sides of the burette – suggesting potential for biofilm formation, or persisting *Salmonella* in storage vessels.

# Assessing factors affecting *Salmonella* in poultry fat

- **Principal Investigators:**

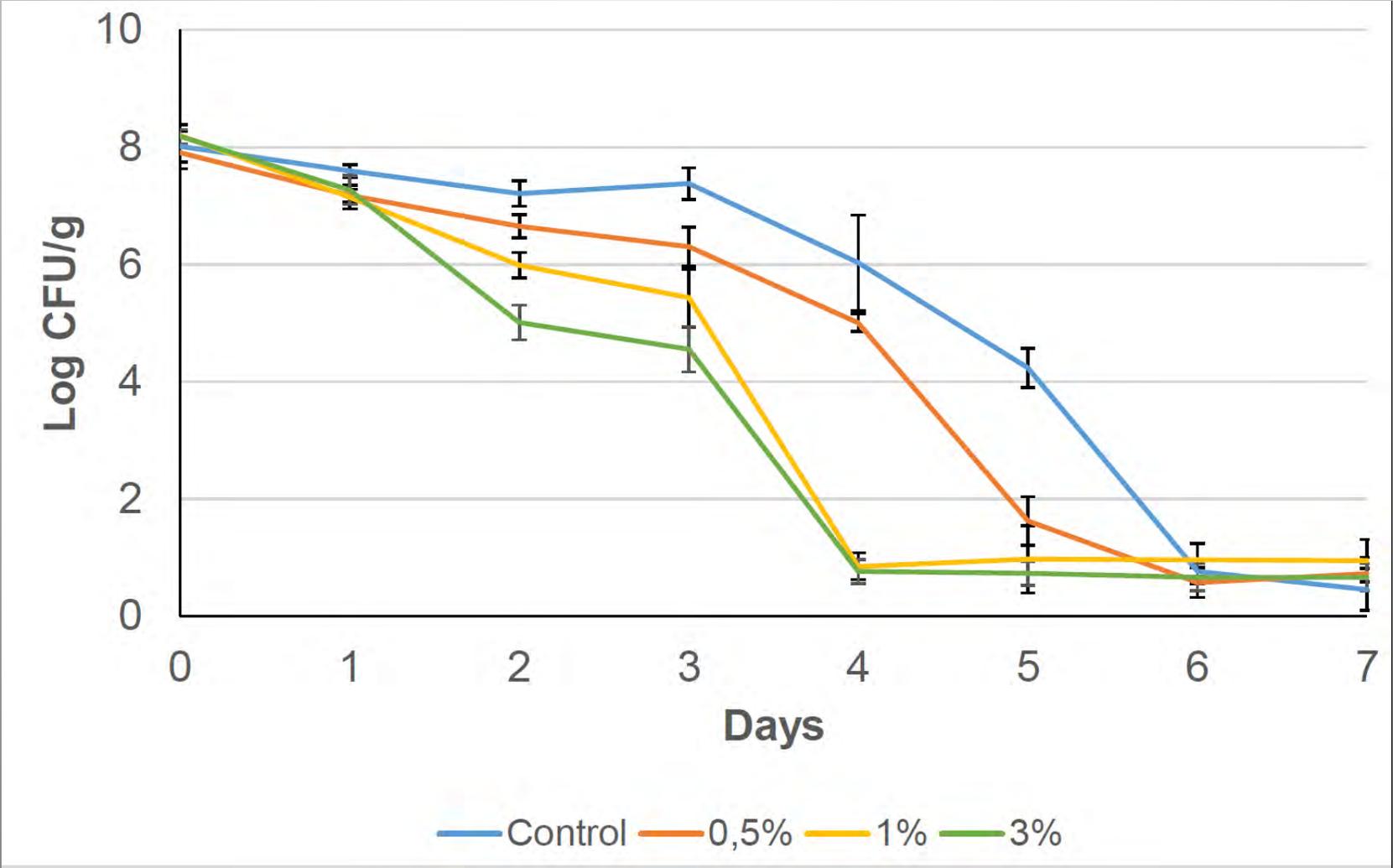
- Dr. Valentina Trinetta, Dr. Cassandra Jones Kansas State University



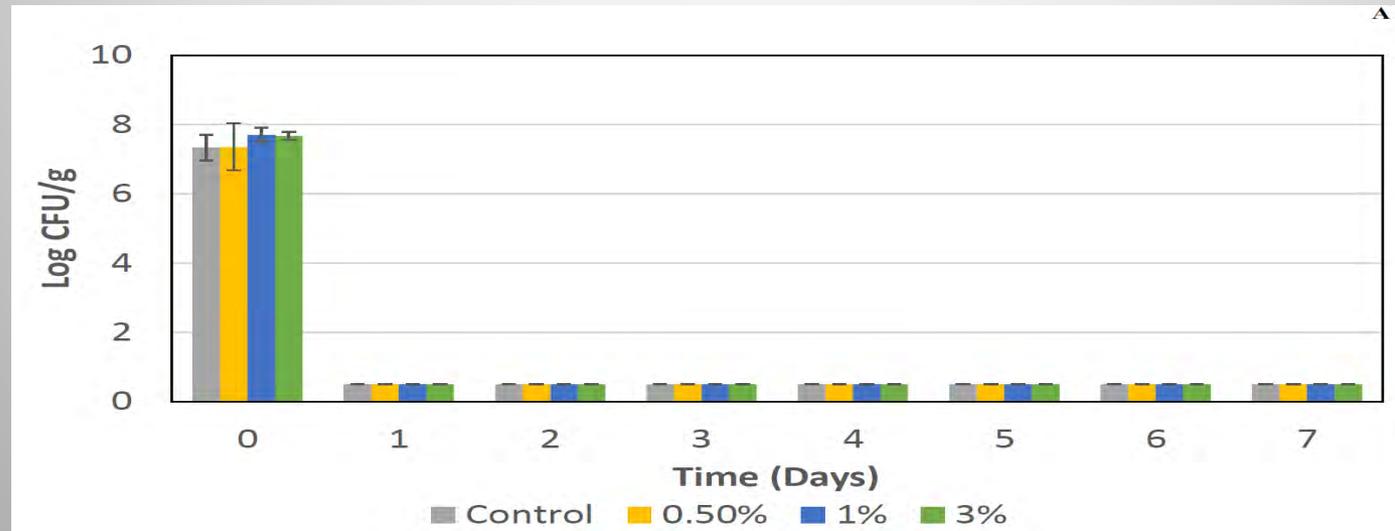
- **Study Purpose:**

- Evaluate the effects of moisture levels and storage temperatures on the growth and survival of *Salmonella* in poultry fat.
- Study effects of 4 moisture levels (0, 0.5%, 1%, and 3), 2 inoculum type (wet and dry) and 2 temperatures (48°C and 76°C) were evaluated in poultry fat inoculated with a low ( $\sim 10^5$  CFU/mL) and high ( $\sim 10^8$  CFU/mL) *Salmonella* cocktail (*S. Newport*, *S. Thompson* and *S. Infantis*).

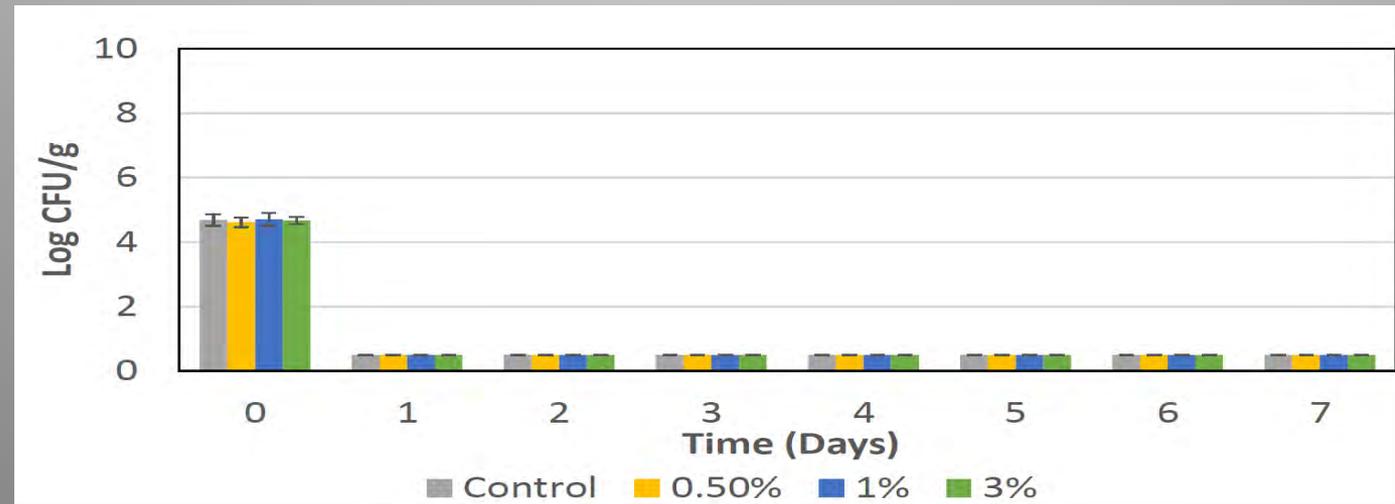
**Salmonella** in poultry fat challenged at 48°C with high dry inoculum levels and different moisture level (0%, 0.50%, 1% and 3%) over time.



## ***Salmonella* remaining in samples at 76°C with high dry inocula levels and moisture level (0%, 0.50%, 1% and 3%) over time**



## ***Salmonella* remaining fat samples at 48°C with low dry inoculum levels and moisture level (0%, 0.50%, 1% and 3%) over time**



# Assessing factors affecting *Salmonella* in poultry fat

## Summary

- Significant and rapid reduction in *Salmonella* observed as a function of increased temp.
- Regardless of moisture level, inoculum level, or contamination level, holding poultry fat at 76°C resulted in minimal detectable *Salmonella* spp. after 24 hours.
- If storing poultry fat at 48°C, post-processing contamination should be minimized as *Salmonella* contamination can persist for several days.
- If storing poultry fat below 48°C, particular care should be taken to prevent excess moisture as it can lead to *Salmonella* growth.

