
Innovation Center for U.S. Dairy Food Safety Committee Overview



Chad Galer
November 6, 2020



The Innovation Center for U.S. Dairy
works across the dairy value chain to
align, promote and speak with a unified voice
about the good work of farmers and the dairy community





27 Board Companies

200+ companies
engaged

Committees/Taskforces

Sustainability Alliance

Common Voice Network



LAND O'LAKES, INC.



Innovation Center for U.S. Dairy

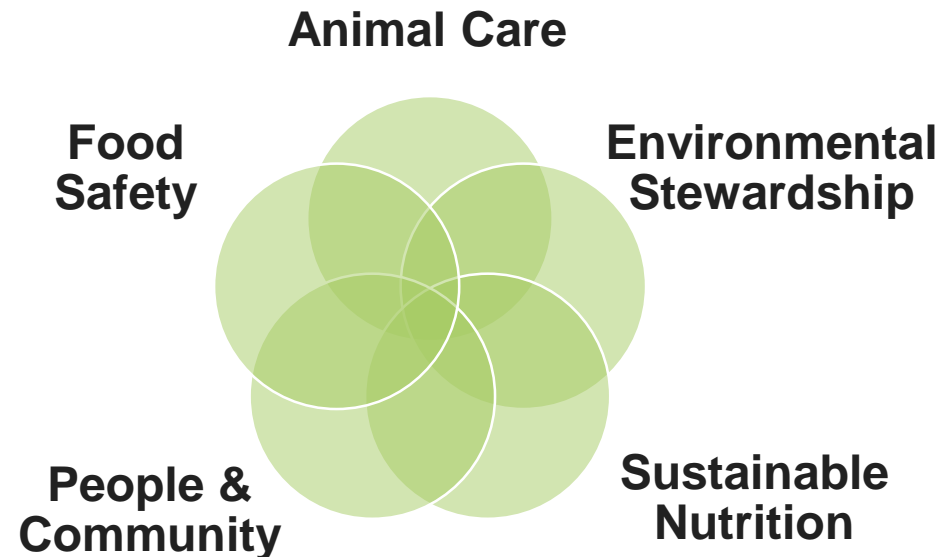
Vision

- *People trust dairy as essential to their lives*

Mission

- *Working together to ensure an economically viable and socially responsible U.S. dairy community from farm to table*

CORE AREAS OF FOCUS



Supported by Communications and Global Insights



Food Safety Committee

Strengthen manufacturing practices in all dairy processing facilities and advance science-based tools to diminish food safety risks that could compromise the reputation of the U.S. dairy industry

- Research
- Training
- Guidance Tools
- Traceability
- Dairy's liaison



Innovation Center Food Safety

- Jeremy Travis - **Hilmar Cheese & Ingredients**
- Dave Kedzierski - **Agri-Mark Cabot**
- Alejandro Mazzotta - **Chobani**
- Marie Tanner - **DFA**
- Eric Van Den Heuvel - **Foremost Farms**
- Jonathan Fischer - **HP Hood**
- Ben Warren - **Land O'Lakes**
- Mike Cureton - **Leprino Foods**
- Brad Suhling - **Prairie Farms**
- Greg Desautels - **Saputo**
- Vijay Krishna - **Sargento Foods Inc**
- Vinith Poduval - **Schreiber Foods**
- John Boortz - **Tillamook**
- Steve Baxley - **United Dairymen of AZ**
- Brian Kraus – **Wells Enterprises**
- Steve Ballard - **Ballard Cheese**
- John Allan - **IDFA**
- Tim Stubbs, Chad Galer, Bill Graves, Greg Miller - **DMI**
- Dave Cook, Jim Mueller, Mary Wilcox - **Facilitators**
- **75+** additional Subject Matter Experts



Innovation Center Food Safety Teams

Innovation Center Committee



Artisan Cheese Advisory Team



Artisan Ice Cream Advisory Team



Strategic/Activation Partners



Listeria Research Consortium



Food safety action platforms

Strengthen manufacturing practices in all dairy processing facilities and advance science-based tools to diminish food safety risks that could compromise the reputation of the U.S. dairy industry



- *Dairy Plant Food Safety Workshops*
- Supplier Food Safety Management
- Pathogen Control Guidance Documents
- Artisan / Farmstead Food Safety
- *Listeria* Research Consortium
- Verification via Auditing
- Regulatory Roundtable
- Traceability

Listeria Research Consortium



- Established January 2015, ~ \$1.1MM funding from
 - Core companies with \$50K contribution
 - National Dairy Council
 - IC board company \$5K each “greater good” contribution
 - 12 projects funded to date



Global experts convened '14, '16, '17, '19

- Targets
 - Listeria controls for products and plant environments
 - Listeria virulence research
 - Critical risk mitigation - surface ripened & fresh cheeses



Industry scientists



Cornell University



Listeria Research Consortium – Project List

Researcher	Title	Project Completion Date
Martin Wiedmann Cornell	Understanding regulation of <i>Listeria</i> monocytogenes cell envelope composition to facilitate development and discovery of improved control strategies	6/30/2018
→ Kevin Keener Iowa State	Controlling <i>Listeria</i> monocytogenes in High Risk Cheeses by Treatment with High Voltage Atmospheric Cold Plasma (HVACP)	6/30/2018
Máire Begley Cork Inst of Tech	Identification of microbially-derived anti-listerial compounds from human microbiome using high-throughput robotics.	8/31/2018
→ Kathleen Glass U. of Wisc	Combinations of acid type, pH, and commercial clean-label antimicrobial ingredients on the growth of <i>Listeria</i> monocytogenes in high-moisture cheese	6/30/2018
Dennis D’Amico U Conn	Utilization of GRAS compounds as antimicrobial dip and coating treatments for controlling <i>Listeria</i> monocytogenes on high moisture cheese	12/31/2017
Mindy Brashears Texas Tech	Inhibition of <i>Listeria</i> monocytogenes on Cheese using Lactic Acid Bacteria as a Biocontrol System Intervention	4/1/2018

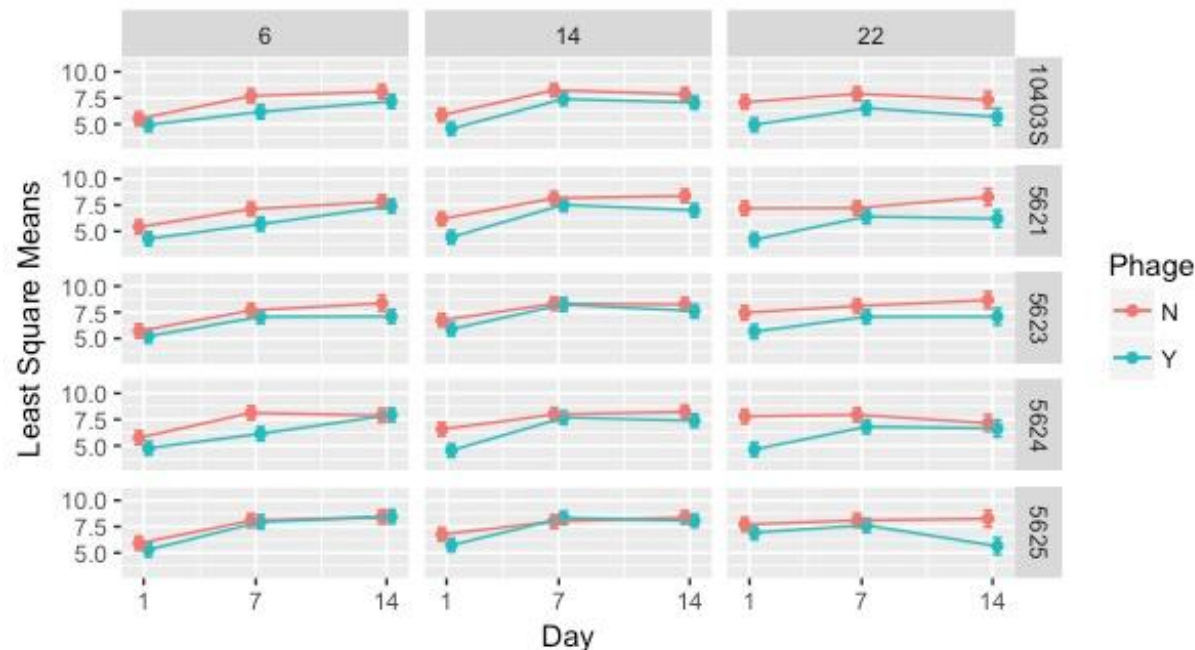
Listeria Research Consortium – Project List

Researcher	Title	Project Completion Date
Stephen Ritchie U. Of Alabama	Functionalized mesh materials for Listeria mitigation in milk and milk-derived products processed in dairy plants	9/30/2020 No cost extension
Sam Alcaine Cornell	Protective Cultures for Listeria Control in High-Risk Cheese	1/15/2020
Dennis D'Amico U Conn	Determining the efficacy of novel glycolipid to control Listeria monocytogenes contamination throughout the production and storage of high-risk cheese	12/31/2020 No cost extension
Tu-Anh Huynh U. Of Wisc	A novel GRAS natural antimicrobial to control Listeria in the dairy processing environment	8/31/2021
Dennis D'Amico U Conn	Optimizing the application of hydrogen peroxide to control <i>Listeria monocytogenes</i> contamination on the surface of high-moisture cheese	12/31/2020 No cost extension
Melha Mellata Iowa State (Keener)	Controlling <i>Listeria monocytogenes</i> in Fresh Cheeses with High Voltage Atmospheric Cold Plasma (HVACP) Treatment – Phase II	11/1/2020

Wiedmann/Cornell

Understanding regulation of *Listeria monocytogenes* cell envelope composition to facilitate development and discovery of improved control strategies

- Hypothesis: Dairy relevant environmental conditions (e.g., pH) have a significant effect on cell surface composition in *L. monocytogenes* and subsequently on the efficiency of cell-wall acting strategies for the control of this pathogen in cheese. Understanding the cell surface and its effect on antimicrobial susceptibility is important to the industry in order to develop the most effective control strategies.



Least square means calculated from the temperature model used to determine the effect of temperature on *L. monocytogenes* sensitivity to the phage cocktail.

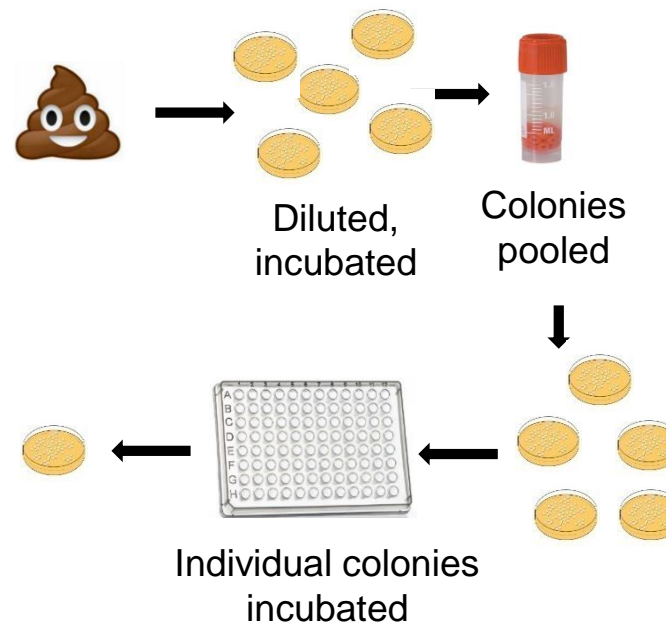
L. monocytogenes strains (10403S, FSL R9-5621, FSL R9-5623, FSL R9-5624, and FSL R9-5625). The phage cocktail is added to surface of cheese (Phage = Y). No phage cocktail on cheese (Phage = N). This graph shows reduced *L. monocytogenes* numbers in the presence of phage for cheese held at 22° C, but not at 6° C or 12° C.

Cork IT/Begley –

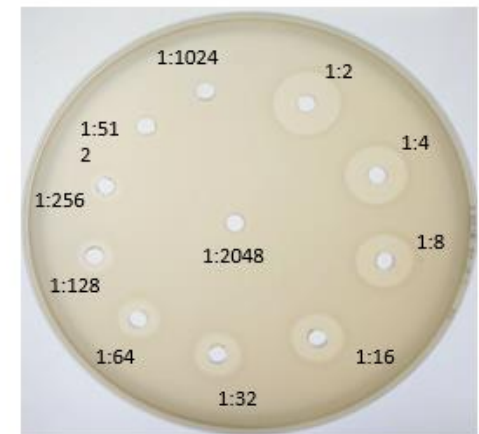
Identification of anti-*Listeria* compounds from human microbiome

- Hypothesis: The human immune system is largely supported by the intestinal microbiome and specific protective organisms and fermentates should be identifiable
 - Screen of donor samples identified 59 listeria inhibition results, at least 17 were unique
 - The antimicrobial peptide produced by isolates 15 and 43 were partially purified and the anti-*Listeria* activity confirmed against 4 strains of *L. monocytogenes* and 1 *L. innocua*.

Faecal Bacterial Bank	No of strains	No of strains
1	6	2
2	4	2
3	13	2
4	10	2
5	1	1
6	1	1
7	2	1
8	7	2
9	4	3
10	11	1
	59	17



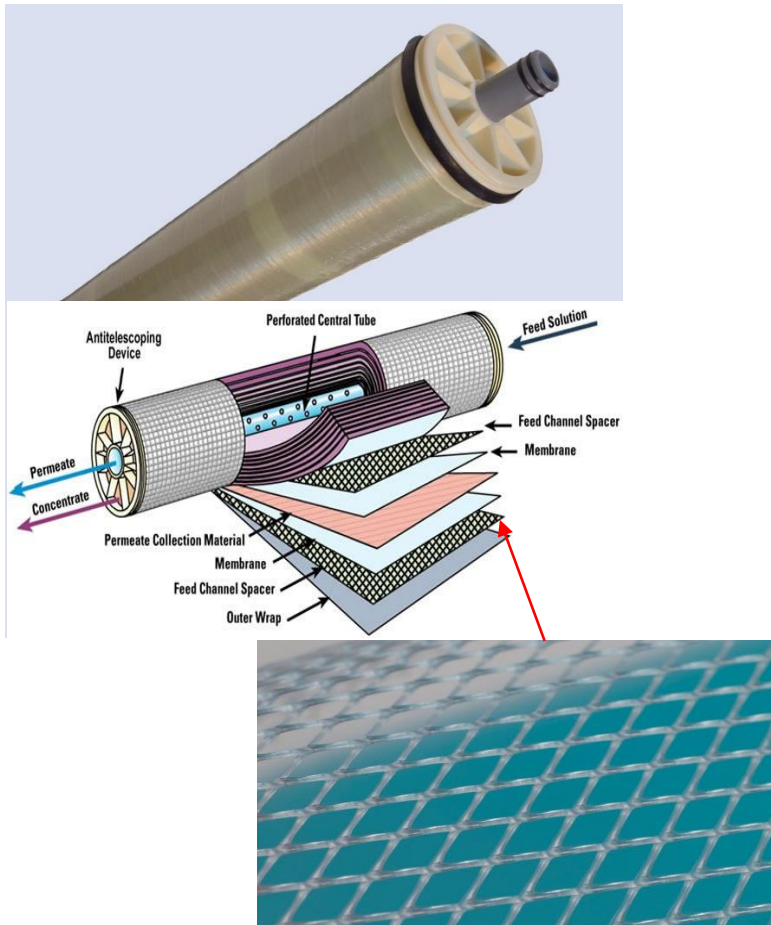
Isolate 15



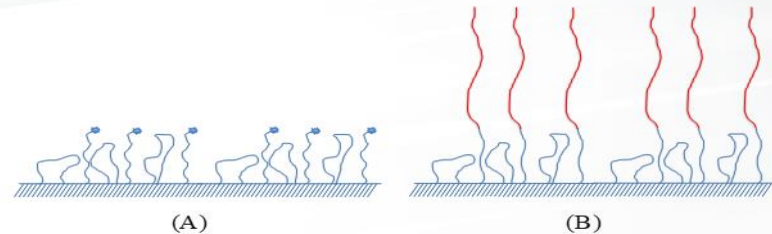
L. monocytogenes 10403S

Alabama/Ritchie – Functionalized mesh materials for *Listeria* mitigation in dairy processing plants

Hypothesis: Plastic surfaces can be functionalized to trap & kill *Listeria* cells. By treating the spacer layers in membrane filters it is possible to turn a difficult to clean part of dairy product/ingredient production into a pathogen control step.

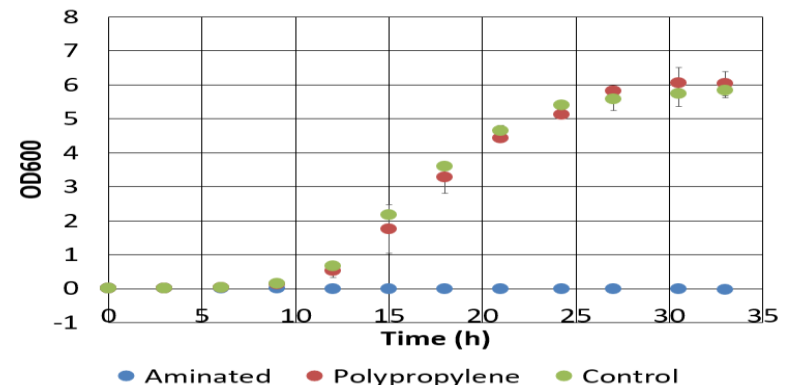


Surface Modification



- A) Dense anti-microbial layer
- B) Diffuse adsorptive layer

Biotesting – Hexadecyl Amine



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Food Safety Resources

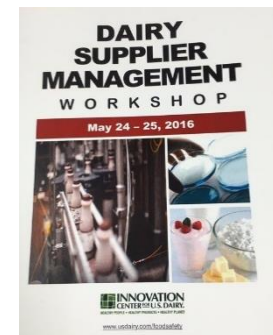
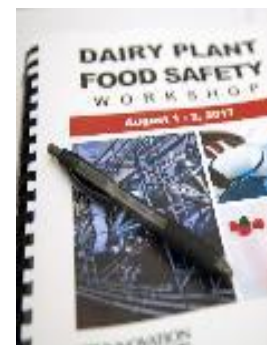
Resources at www.usdairy.com/foodsafety

Dairy Plant Food Safety Workshops

Design checklists, scientific reference materials, registration

Supplier Food Safety Management Workshops

Building a program, Risk assessment calculator, and Best Practices guide



Control of *Listeria* Guidance for the U.S. Dairy Industry

Comprehensive, *Listeria* Guidance document written by industry Free online in English and Spanish

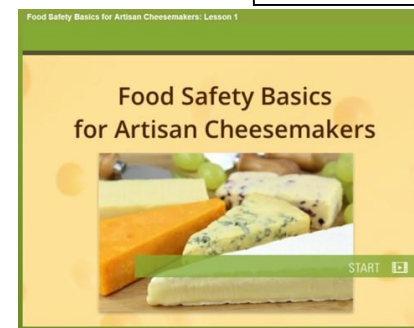
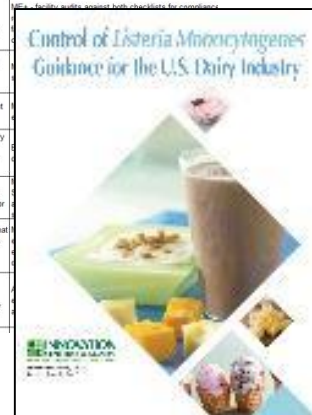
Spanish Language Tools

Traceability Guidance

Artisan and Farmstead Resources www.usdairy.com/artisan

- ❑ **Hands-on Food Safety Coaching** – Work sessions to help artisan and farmstead producers develop/improve their Food Safety Plan www.dairyfoodsafetycoalition.com
- ❑ **Support** - Help with questions and email/phone support for Artisan Dairy producers at dairyfoodsafetycoach@cornell.edu
- ❑ **Food Safety Basics for Artisan Cheesemakers** – Online food safety course through NCSU accessible anytime/anywhere <https://bit.ly/2UsjSNh>
- ❑ **Safe Cheesemaking and Ice Cream Hubs** – Centralized food safety links with the American Cheese Society www.safecheesemaking.org and with IDFA at www.safeicecream.org

Sanitary Design of Equipment and Facilities		
#	Minimum Expectation	Best Of Class
58		
59		
60		
61	4A Facility utilizes the 10 Point Sanitary Design Checklist for Equipment and the 10 Point Sanitary Design Checklist for Infrastructure in conjunction with 3A Standards to format a facility assessment program for pathogen control.	
62	4B Corporate support is available for assistance with sanitary design compliance and if not- available support is contracted externally- (resource list available)	
63	4C Members of the Sanitation and Quality Staff are requested for input on sanitary design prior to the initiation of project start-up	
64	4D New equipment design is reviewed by trained personnel for sanitary design compliance at delivery- prior to installation- in a proactive nature to identify and mitigate areas of concern related to sanitary design	
65	4E Members of Sanitation and Quality are aware of all repairs conducted on High-Hygiene areas to ensure that there is approval upon completion for compliance to sanitary design requirements for cleaning and inspection	
66	4F Facility has a preventative maintenance and work order program that ensures a focus on the elimination of potential niche environments or harborage sources of pathogens due to lack of access or difficulty of cleaning and inspection	
67	4G A review of facility infrastructure and equipment is conducted in conjunction with respective corporate staff or outside entity with expertise (resource list available) to identify existing poor sanitary design points and identify corresponding mitigation actions	

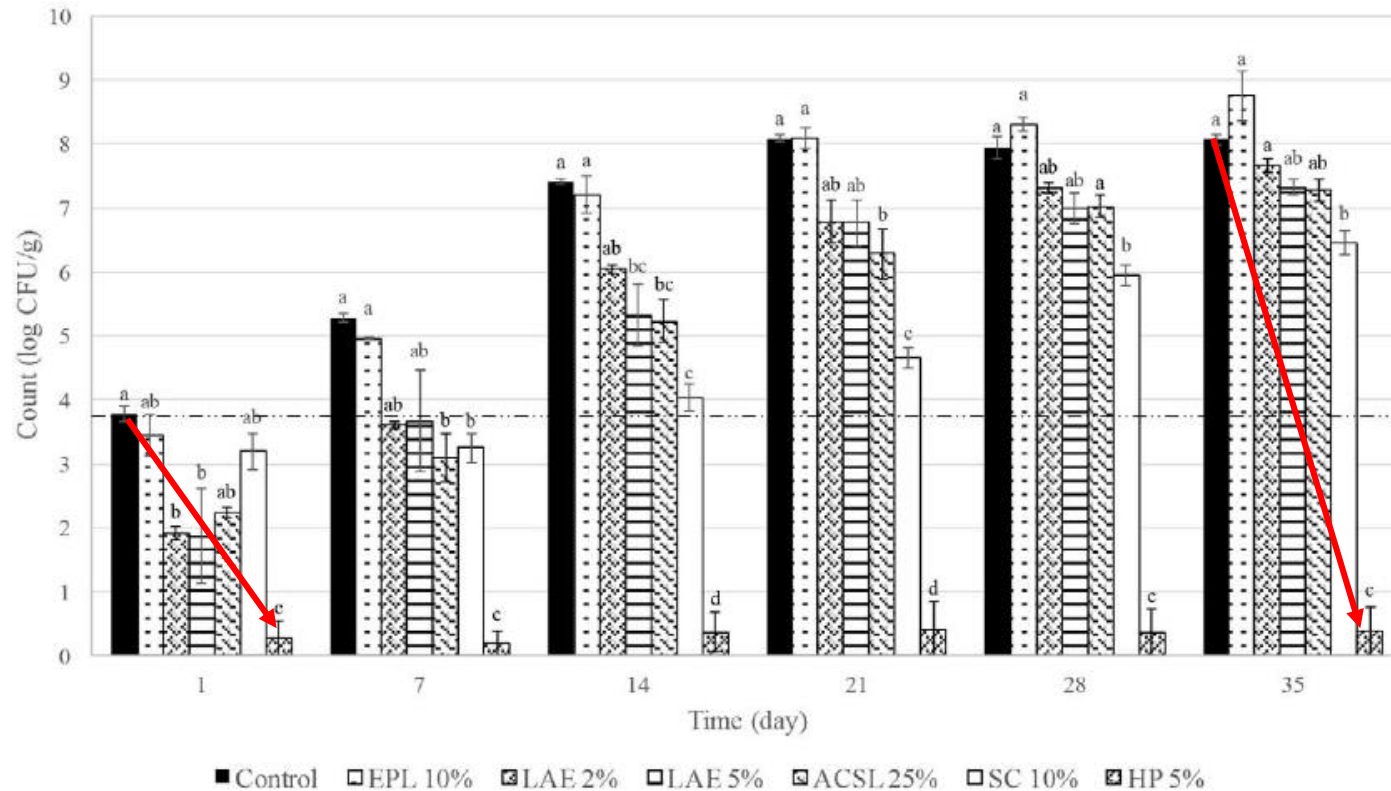


THANK YOU!

UConn/D'Amico Lab –

GRAS compound antimicrobials to control *Lm* on high moisture cheese

Systematic evaluation of known antimicrobials in Queso Fresco



e-polylysine (EPL), lauric arginate ethyl ester (LAE), acidified calcium sulfate with lactic acid (ACSL), and sodium caprylate (SC), hydrogen peroxide (HP)