

2-28-2022

## Development of Add-on Materials to Supplement Food Safety Modernization Act Trainings in the Western U.S.

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### Recommended Citation

Kovacevic, J. (2022). Development of Add-on Materials to Supplement Food Safety Modernization Act Trainings in the Western U.S.. *The Journal of Extension*, 60(1), Article 10. <https://doi.org/10.34068/joe.60.01.11>

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### Cover Page Footnote

A special thank you goes to Aurora Saulo and Lynn Nakamura-Tengan from the University of Hawaii, who hosted the meeting in Hawaii, and Joy Waite-Cusic for reviewing and editing this manuscript. Thank you also to co-Principal Investigators of the WRCEFS 2015-2018 grant, Marisa Bunning, Christina DeWitt, Linda Harris, Robert McGorin, Michael Morrissey and Barbara Rasco for their assistance in organizing the meeting. The participation of many WRCEFS members in the development of add-on materials is much appreciated, especially the efforts of lead authors: Erin DiCaprio, Linda Harris and Trevor Suslow (UC-Davis); Christina DeWitt (Oregon State University); Barbara Rasco (Washington State University); Channah Rock (University of Arizona); Joshua Silva, Sharon Wages and Kylie Wong (University of Hawaii); and Jian Yang (University of Guam). This work was supported by the National Food Safety Training, Education, Extension, Outreach and Technical Assistance Competitive Grants Program 2015-70020-24398 from USDA National Institute of Food and Agriculture.

# Development of Add-On Materials to Supplement Food Safety Modernization Act Trainings in the Western U.S.

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**Abstract.** During the 2017 annual meeting of the Western Regional Center to Enhance Food Safety, 52 representatives from 15 western states/territories, regional centers funded through USDA-NIFA Food Safety Outreach Program, federal and state government agencies, and non-governmental organizations prioritized topics for the Food Safety Modernization Act (FSMA) training materials that address region-specific agricultural production and processing systems. This article describes supplemental materials or “add-ons” developed to support FSMA-related food safety trainings. Although the materials were developed for the western region stakeholders, they can be applied or adapted to other regions in or outside the U.S. to enhance food safety trainings.

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## INTRODUCTION

The Western Regional Center to Enhance Food Safety (WRCEFS) is one of four regional centers established in 2015 to assist Extension educators and food industry professionals with training programs and outreach relevant to the Food Safety Modernization Act (FSMA). It encompasses 13 states and two territories, representing more than half the land mass of the United States and over 50% of the specialty crop market value (USDA, 2015; WRCEFS, 2015). To accommodate a wide variety of agricultural systems, WRCEFS is divided into four sub-regions (Figure 1). From 2015 to 2018, WRCEFS activities largely focused on the professional development of credentialed trainers in the Western Region to deliver certified Produce Safety Alliance (PSA, 2020) and Food Safety Preventive Controls Alliance (FSPCA, 2020) trainings. During this time, the need for supplemental materials, referred to as “add-ons,” to reflect region-specific agricultural production and processing systems was identified across the regions (Fouladkhah, 2017; Strohbehn et al., 2018). To help identify key topics of interest for the add-on material development, WRCEFS organized special sessions during the 2017 annual meeting. In this article we describe the topics that were prioritized and the materials that were subsequently developed to supplement the standardized curricula for FSMA Preventive Controls for Human Food (PCHF) and Produce Safety Rule (PSR). These resources were developed for PSA and FSPCA trainers (e.g., >700 PSA trainers; >250 FSPCA trainers in the Western Region).

## PRIORITIZATION PROCESS FOR THE DEVELOPMENT OF ADD-ON MATERIALS

Representatives (n = 52) from 13 Western states and two territories, other regional centers (Northeast, North Central, Southern), the Alliances, federal and state government agencies, and non-governmental organizations (NGOs) attended two breakout sessions at the WRCEFS annual meeting in March 2017 in Honolulu, HI (Figure 2).

Breakout sessions were focused on preventive controls or produce safety topics. An identical format was followed with participants divided into eight groups of four to eight people per group. Each group was given 25 minutes to brainstorm, discuss, record, and report: (1) add-on topic and/or sub-topic; (2) suggested format; (3) target audience; and (4) learning level (beginner, intermediate, advanced). A total of 25 preventive controls, 39 produce safety topics, and 16 model food safety plans (FSPs) were identified. Of these, eight add-on projects and two FSPs were funded and completed (Table 1). Additional topics that were identified as important but have not yet been addressed through WRCEFS projects are listed in Table 2.

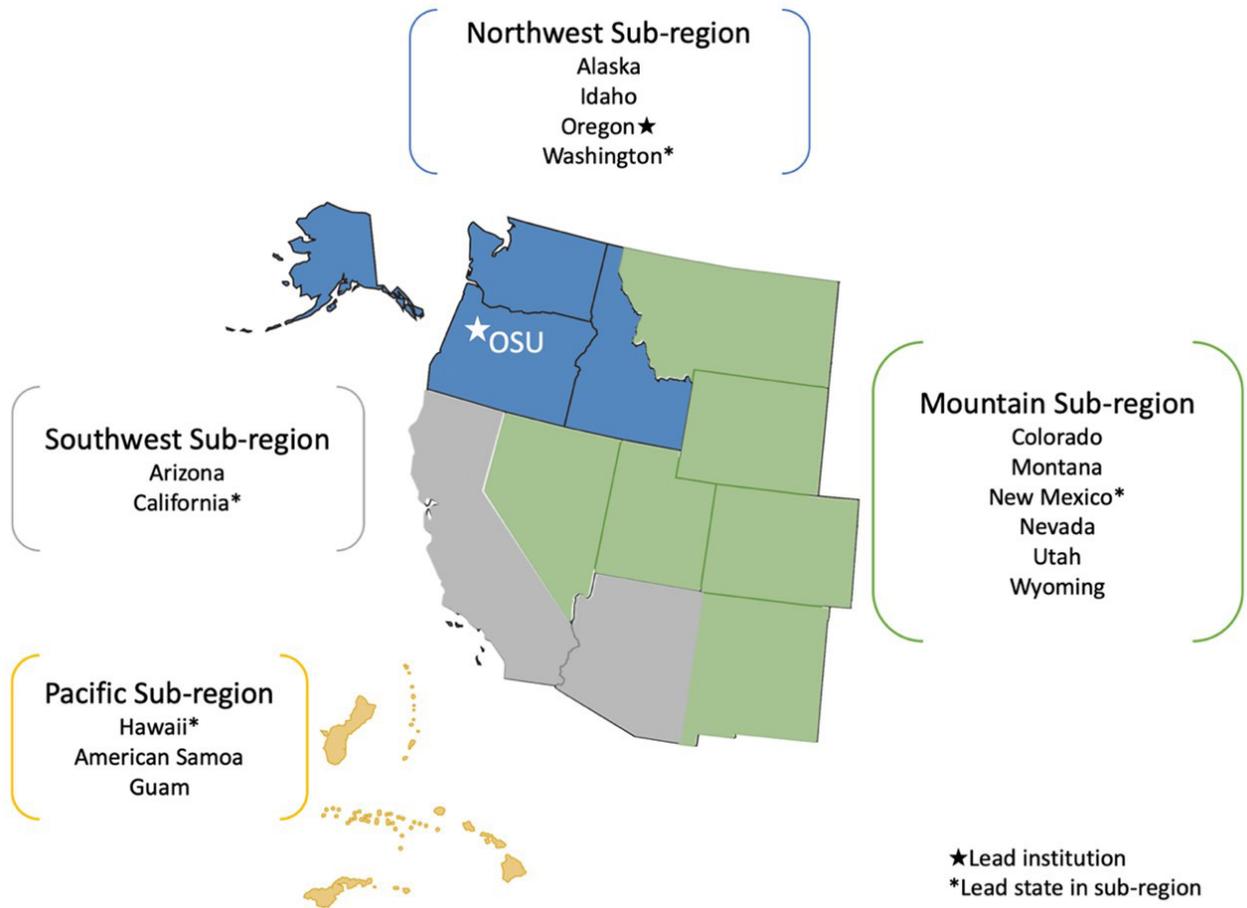


Figure 1. Sub-regions and lead institutions of the Western Regional Center to Enhance Food Safety.

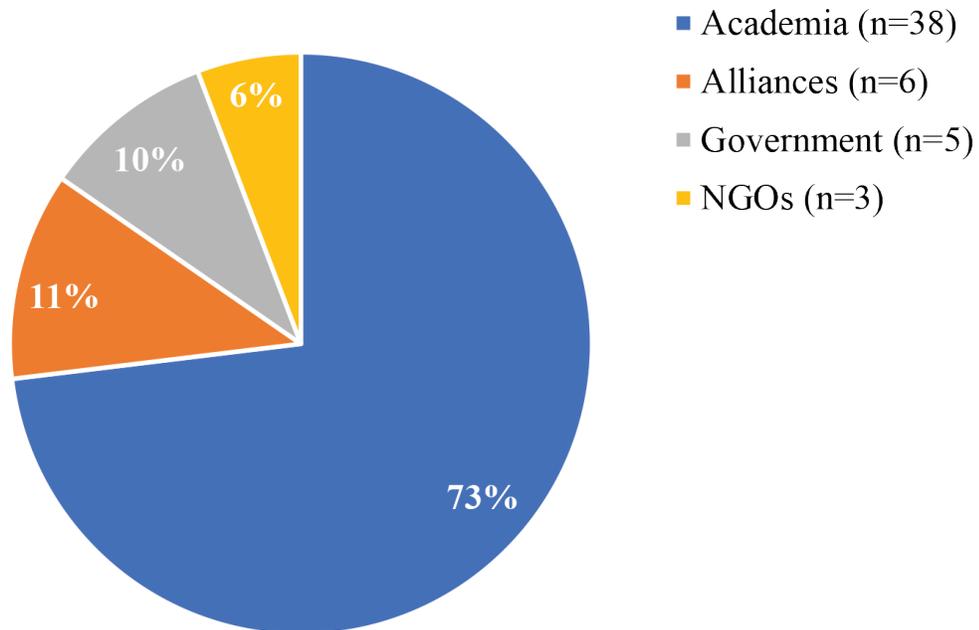


Figure 2. Breakdown of representatives by organization type that participated in the prioritizing and development of add-on FSMA teaching materials for the Western Region (n = 52).

# Add-On Materials to Supplement Food Safety Modernization Act Trainings in the Western U.S.

**Table 1.** Prioritized Add-On Topic Areas with Preventive Controls or Produce Safety Focus

Topic areas prioritized	Completed projects format and source link(s)	Views/downloads <sup>a</sup>
<b>Focused on preventive controls</b>		
Simplified Preventive Controls for Human Food (PCHF) training for small scale processors	Pre-PCQI workshop Teaching slides, in-person delivery <a href="https://agsci.oregonstate.edu/wrcefs/resources">https://agsci.oregonstate.edu/wrcefs/resources</a>	Not individually tracked
Pistachio process validation	Guidelines for using <i>Enterococcus faecium</i> NRRL B-2354 as a surrogate microorganism in pistachio process validation <a href="https://ucfoodsafety.ucdavis.edu/sites/g/files/dgvnsk7366/files/inline-files/292321.pdf">https://ucfoodsafety.ucdavis.edu/sites/g/files/dgvnsk7366/files/inline-files/292321.pdf</a>	37
Value-added on-farm processing in California	California cannery license program Processed food registration in California: permit Timeline Brochures: <a href="http://ucfoodsafety.ucdavis.edu/files/287956.pdf">http://ucfoodsafety.ucdavis.edu/files/287956.pdf</a> <a href="http://ucfoodsafety.ucdavis.edu/files/287953.pdf">http://ucfoodsafety.ucdavis.edu/files/287953.pdf</a>	192 219
Sanitation and environmental monitoring	Sanitation and environmental monitoring workshop Teaching slides, in-person delivery <a href="https://agsci.oregonstate.edu/wrcefs/resources">https://agsci.oregonstate.edu/wrcefs/resources</a>	N/A <sup>b</sup>
Food safety for cottage industry	Food safety education for the cottage industry and farmers market groups Survey, videos Cross contamination: <a href="https://vimeo.com/471232548">https://vimeo.com/471232548</a> Washing produce: <a href="https://vimeo.com/471233230">https://vimeo.com/471233230</a> Storage and refrigeration: <a href="https://vimeo.com/471233177">https://vimeo.com/471233177</a> Cleaning and sanitizing: <a href="https://vimeo.com/471233072">https://vimeo.com/471233072</a> Worker hygiene: <a href="https://vimeo.com/471232271">https://vimeo.com/471232271</a>	11 10 4 11 7
Commodity-specific food safety plan teaching examples	Teaching example food safety plan for breadfruit flour <a href="https://agsci.oregonstate.edu/wrcefs/resources">https://agsci.oregonstate.edu/wrcefs/resources</a>  A guide to the aquaponics food safety plan development: Green aquaponics LLC as a model <a href="https://vtechworks.lib.vt.edu/bitstream/handle/10919/88927/FST-302.pdf?sequence=1">https://vtechworks.lib.vt.edu/bitstream/handle/10919/88927/FST-302.pdf?sequence=1</a>	3  N/A <sup>b</sup>
<b>Focused on produce safety</b>		
Agricultural water	Improvements to grower tools supporting the agricultural water rule—phone/tablet app <a href="http://agwater.arizona.edu">http://agwater.arizona.edu</a>  Small farm agricultural water monitoring and treatment—multilingual training videos <a href="https://vimeo.com/471238934">https://vimeo.com/471238934</a>	23,514  15
Repository/ database of resources	FSMA produce safety resources Database developed, but not yet published <a href="http://postharvest.ucdavis.edu/FSMA_Produce_Safety_Resources/">http://postharvest.ucdavis.edu/FSMA_Produce_Safety_Resources/</a>	N/A <sup>c</sup>

<sup>a</sup> Tracking numbers current as of August 2021.

<sup>b</sup> Not available, as views and downloads are not tracked by WRCEFS.

<sup>c</sup> Components of the project completed; however, final version is not yet publicly available.

**Table 2.** Other Topics Identified as Important

Topic Area
<i>General</i>
Needs assessment for developing add-on material; survey; audience demographics for add-ons and the impact add-ons; longevity of add-ons
Practical guidance for environmental monitoring for packing and small processors
Wildlife
Controlled environment agriculture
Farmer self-assessment materials
Bilingual/multi-lingual materials
Biological soil amendments
New adult education concepts; beginner-level education audiences; leverage university resources; interactive apps; learning evaluations
Resources for very small operations
Resources for internal inspections and audits of Food Safety Plans
Introduction to risk and hazards for very small food processors (e.g., one to two people processing and distributing sales)
Sanitary design—equipment design, use of equipment to meet sanitation specifications for handling of products to minimize risk
<i>Food Safety Plan (FSP) Teaching Examples</i>
Processed onions
Tree fruits (fresh cut and frozen)
Processed nuts
Food hubs
Microgreens and bagged greens
Sliced fresh cut fruit
Fresh juices

## DEVELOPED ADD-ON MATERIALS: USES AND IMPACT

A resources page on the WRCEFS website has been developed to house the content created by WRCEFS members, including the materials described here. As of August 2021, the resources page has received 849 views, including viewers from eight countries and 81 cities. In addition, the use of resources is tracked through the institutions that developed the materials, with views and/or download numbers (as of August 2021) provided in Table 1.

### SIMPLIFIED PCHF TRAINING FOR SMALL-SCALE PROCESSORS

Training materials were developed to help small processors gain basic understanding of food safety fundamentals, preventive controls, and requirements under FSMA. Seven modules, delivered in person, included: (1) introduction to FSMA; (2) food safety basics; (3) overview of PCHF; (4) PCHF exemptions; (5) current good manufacturing practices; (6) cleaning and sanitation; and (7) developing FSPs.

### GUIDELINES FOR PISTACHIO PROCESS VALIDATION

The developed document describes the use of *Enterococcus faecium* NRRL B-2354 in validating thermal processes for pistachios, including how to prepare inoculum and how to store and transport the inoculated pistachio samples. It is based on research conducted at the University of California-Davis and Michigan State University.

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### VALUE-ADDED ON-FARM PROCESSING IN CALIFORNIA

One flow chart and two timelines were developed to help users determine which state and federal regulations apply to their particular value-added product, clarify information needed to obtain a Processed Food Registration in California, and provide guidance to food processors interested in producing acidified canned foods or low-acid canned foods in California.

### SANITATION AND ENVIRONMENTAL MONITORING WORKSHOP

Training materials were developed for a workshop on cleaning and sanitation in food handling, processing, and manufacturing facilities, including topics on: (1) hazards and strategies to control them; (2) environmental monitoring; and (3) sanitation in the processing facilities (i.e., sanitary equipment and facility design, cleaners and sanitizers, strategies for pest control, and allergen control strategies).

### COMMODITY-SPECIFIC FOOD SAFETY PLAN TEACHING EXAMPLES

#### Breadfruit Flour

A model FSP for breadfruit flour provides information on the principles of the risk-based preventive controls that should be utilized during the production of breadfruit flour.

#### Guidance and FSP for Aquaponics Producers

Educational materials were developed for aquaponic producers to help them improve their food safety plans, monitoring, and recordkeeping systems.

### IMPROVEMENTS AND TRANSLATION OF GROWER TOOLS SUPPORTING THE AGRICULTURAL WATER RULE

This project helped improve the functionality of tools (e.g., Ag Water calculators) developed by the Western Center for Food Safety and the University of Arizona to assist growers in determining if water meets the standards for unrestricted application to produce before harvest. This project also supported translating these tools to Spanish.

## SUMMARY

In the Western region, significant progress has been made towards FSMA outreach through the establishment of a cadre of trainers to educate growers and processors based on the PSA and FSPCA curricula, respectively. The resources described here were created to assist Extension educators in training produce growers and food processing stakeholders on food safety and FSMA. These resources can be used directly to supplement food safety trainings, or they can be modified to fit the requirements of other regions or specific target audiences.

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