Produce Food Safety:
Key Concerns and On-Farm Research in Vermont

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The UNIVERSITY of VERMONT EXTENSION

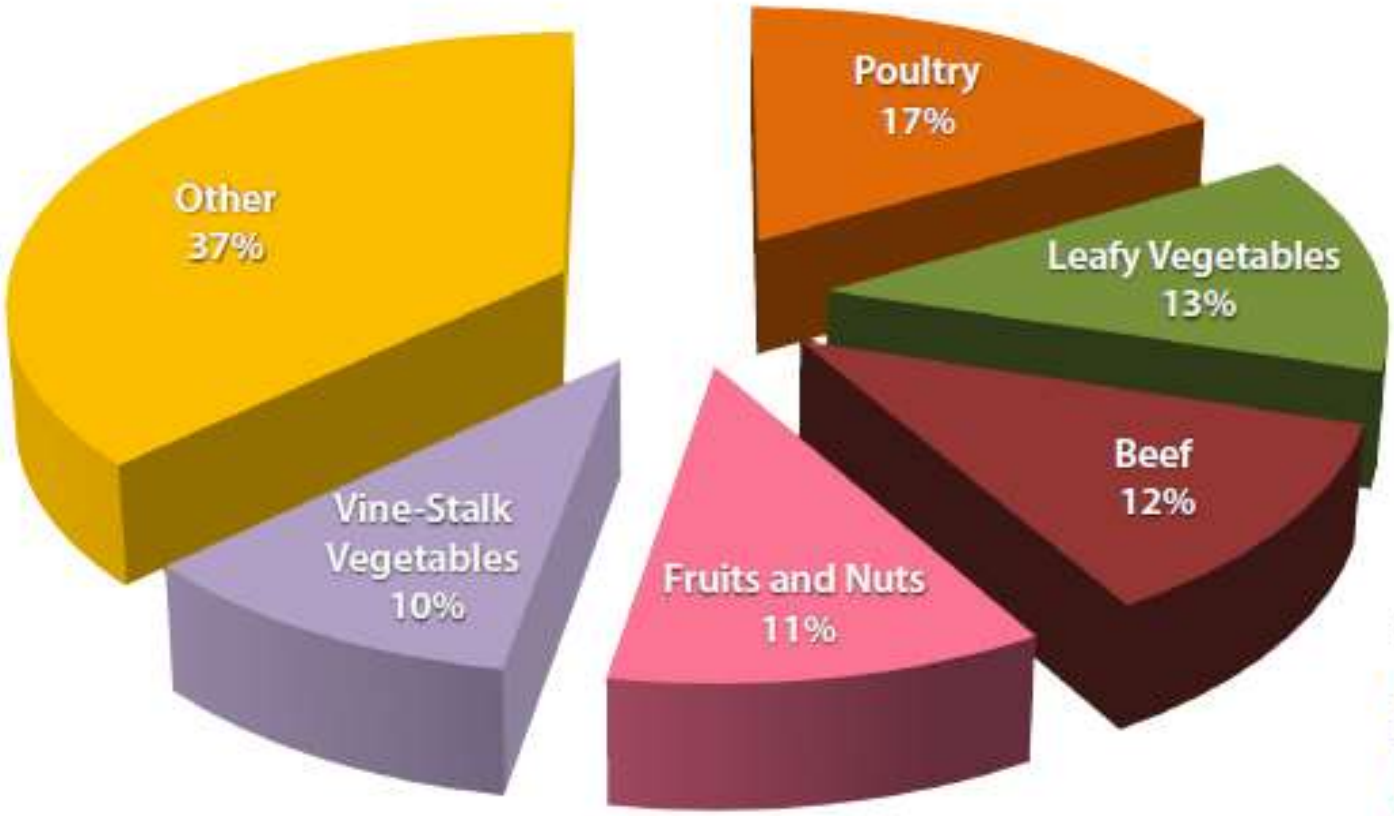
Today's Topics

- Overview - food safety history
- Some data - food borne illness
- Key practices to reduce risk
- On-farm wash water studies
- Areas of concern going forward
- Next steps

Some Food Safety History

- 1862 Lincoln establishes USDA, ~FDA
- 1906 Pure Food and Drug Act
- 1936 Food Drug and Cosmetic Act
- 1990's HACCP
- 1998 GAPs guidelines
- 2011 FSMA law, 2013 draft rules

Foods Linked to Outbreak-Associated Illnesses, 1998 - 2008



Food Categories and Number of Illnesses

- Poultry: 11,302
- Leafy Vegetables: 8,836
- Beef: 8,033
- Fruits and Nuts: 7,590
- Vine-Stalk Vegetables: 6,963
- Other: 25,028

(Other includes: Dairy, Pork, Fish, Eggs, Mollusks, Grains and Beans, Root Vegetables, Crustaceans, Sprouts, Oils and Sugars, Game, and Fungus)

CDC. Surveillance for Foodborne Disease Outbreaks – United States, 1998-2008. MMWR 2013;62(No. SS-2).

//www.cdc.gov/foodsafety/pdfs/food-and-illnesses-pie-chart-508c.pdf

Foodborne Disease Outbreaks, 2009-2010*

Outbreaks reported:	1,527
Cases of illness:	29,444
Hospitalizations	1,184
Deaths:	23

*Source: Foodborne Disease Outbreak Surveillance System, 2009-2010 are the most recent years for which outbreak data are finalized.

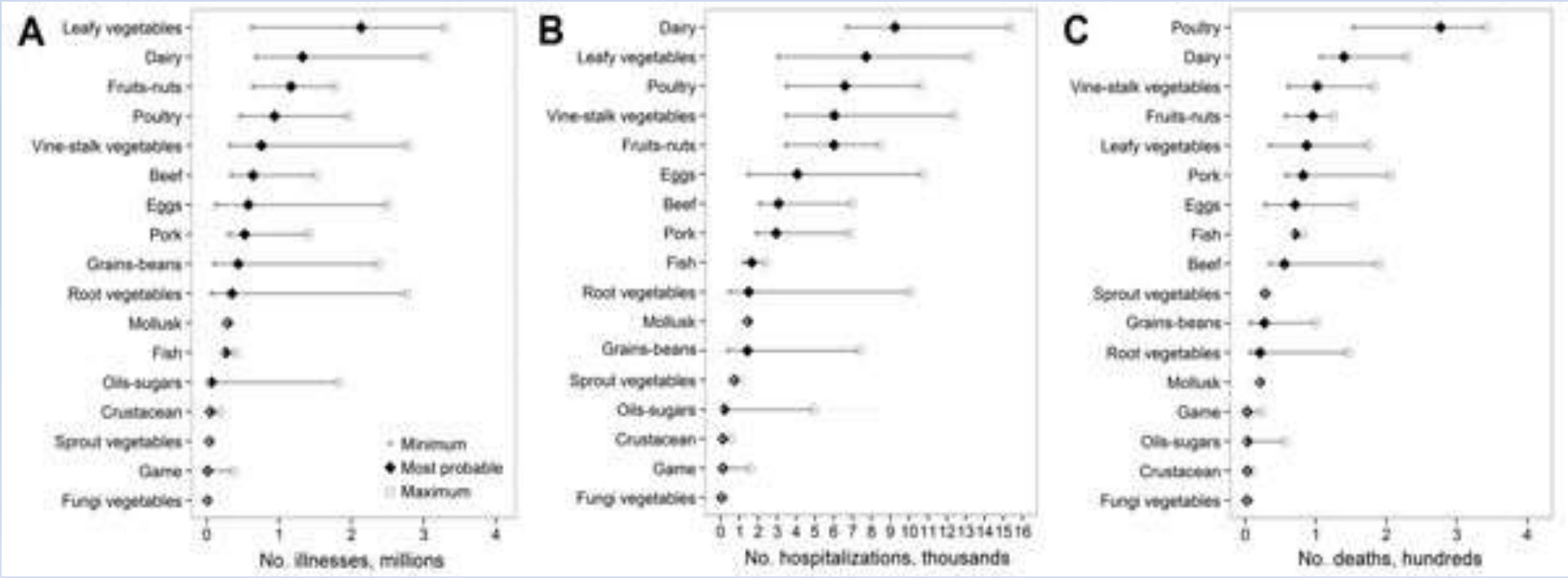
http://www.cdc.gov/Features/dsFoodborneOutbreaks/

- Illnesses
  - Salmonella -eggs (2231)
  - Salmonella -sprouts (493)
  - Salmonella -vine stalk vegetables (422)

- Hospitalizations
  - Salmonella - vine-stalk vegetables (88)
  - E. coli O157 -beef (46)
  - Salmonella -sprouts (41)

- Deaths
  - E. coli O157 beef (3)
  - Salmonella in pork (2)
  - Listeria in dairy (2)

Minimum, most probable, and maximum estimates of the *annual* number of foodborne illnesses, hospitalizations, and deaths from all etiologies attributed to food commodities, United States, 1998–2008



Source: Painter, et al., 2013 (CDC)
http://wwwnc.cdc.gov/eid/article/19/3/11-1866_article.htm

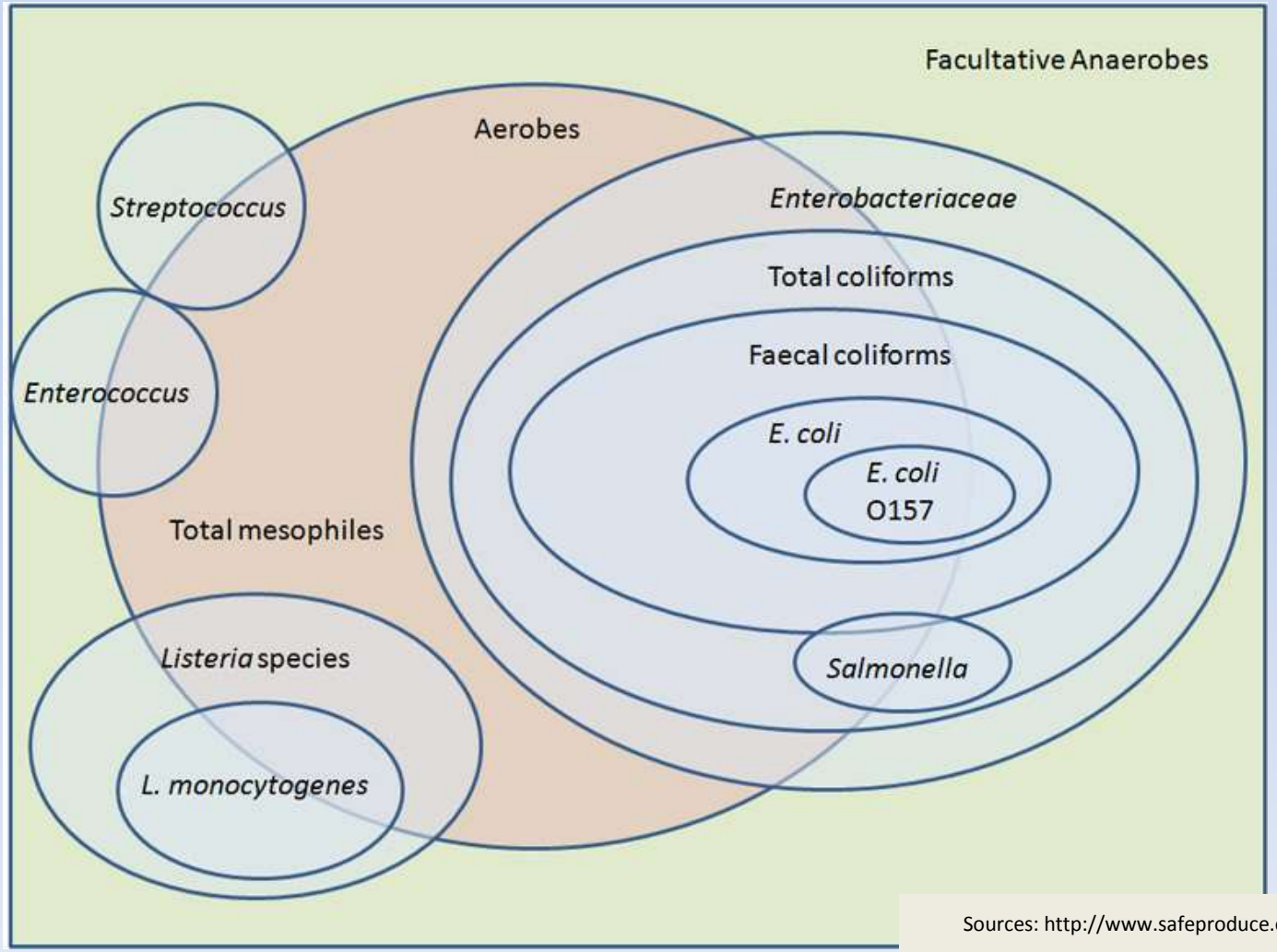
Eight pathogens cause most of the problems

Pathogen	Cause of illness	Cause of hospitalization	Cause of death
Norovirus	58%	26%	11%
Salmonella, nontyphoidal	11%	35%	28%
Clostridium perfringens	10%	-	-
Campylobacter spp.	9%	15%	6%
Staphylococcus aureus	3%	-	
Toxoplasma gondii	-	8%	24%
E.coli (STEC) O157	-	4%	-
Listeria monocytogenes	-	-	19%

Source: U.S. Centers for Disease Control

E.coli testing can indicate risk, it's not a precise tool.

Escherichia coli bacteria live in the intestines of people and animals. Most are harmless, some strains are pathogenic.



Sources: http://www.safeproduce.eu/WaterTesting.htm

What's actually in/on fresh produce

16,896 samples, from 390 retail sites in the U.S.

pathogenic E. coli - 24 samples confirmed

Salmonella – 32 samples confirmed

Source: USDA Microbiological Data Program, Progress Update and 2009 Data Summary

key areas to reduce risk on farms

- **personnel:** training, health and hygiene
- **agricultural water:** irrig., spray, wash
- **soil amendments:** manure, compost
- **domestic and wild animals**
- **equipment, tools, buildings**: sanitation
- **storage conditions, traceability**

Fresh Produce Food Safety Risks

GROWING

- manure, compost
- irrigation water
- wildlife
- livestock
- workers

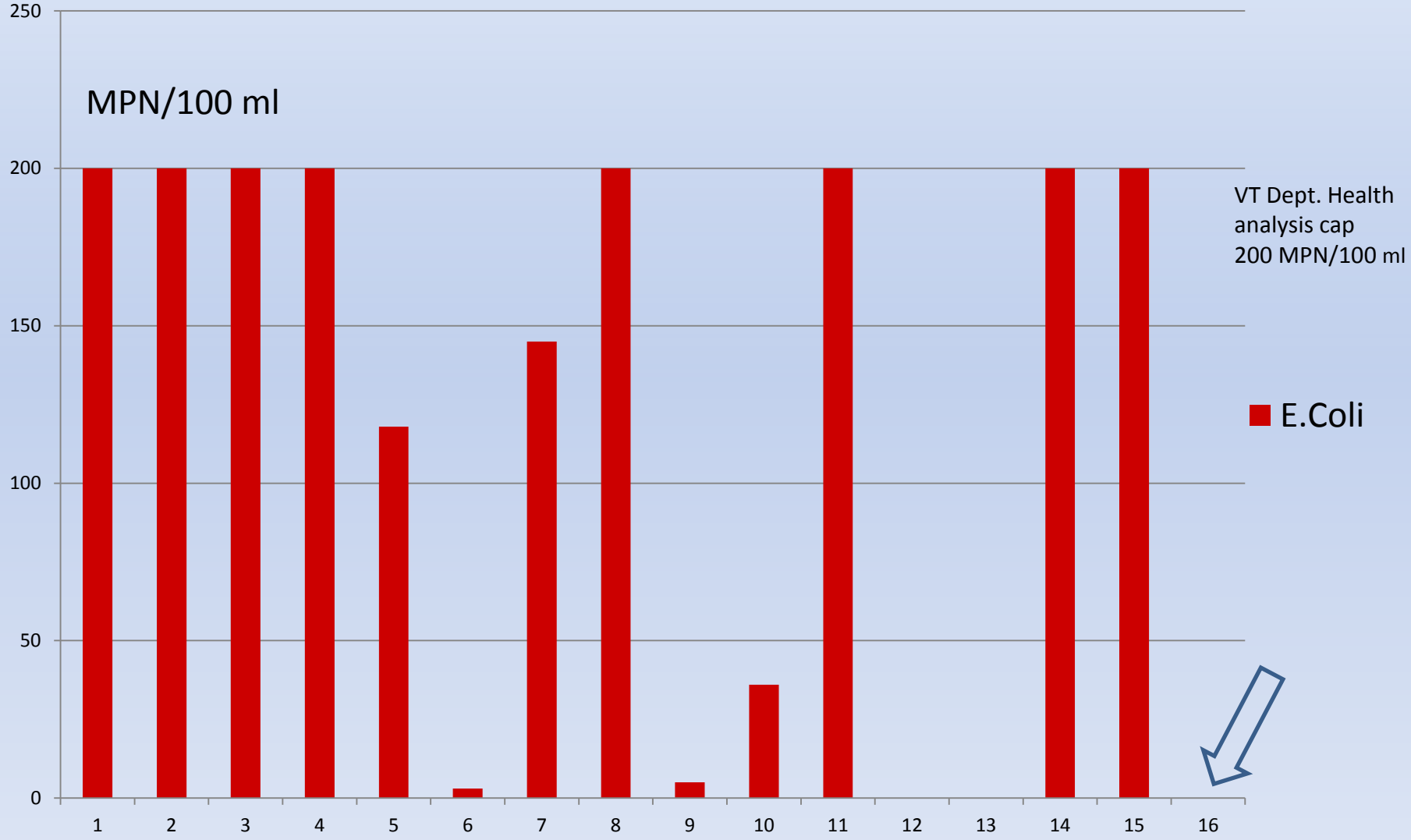
HANDLING

- harvest
- **washing**
- packing, storing
- shipping

OFF FARM

- consumer
- retailer
- distributor

Generic E. coli in Vegetable Wash Water, Post-Wash , July 2008



16 farms, various crops, various wash systems

growers use many different types of wash systems


leafy greens wash systems are of particular concern
300 Gallon
1136 Liter
Rubbermaid
single plastic tub


double plastic tub

double steel sinks

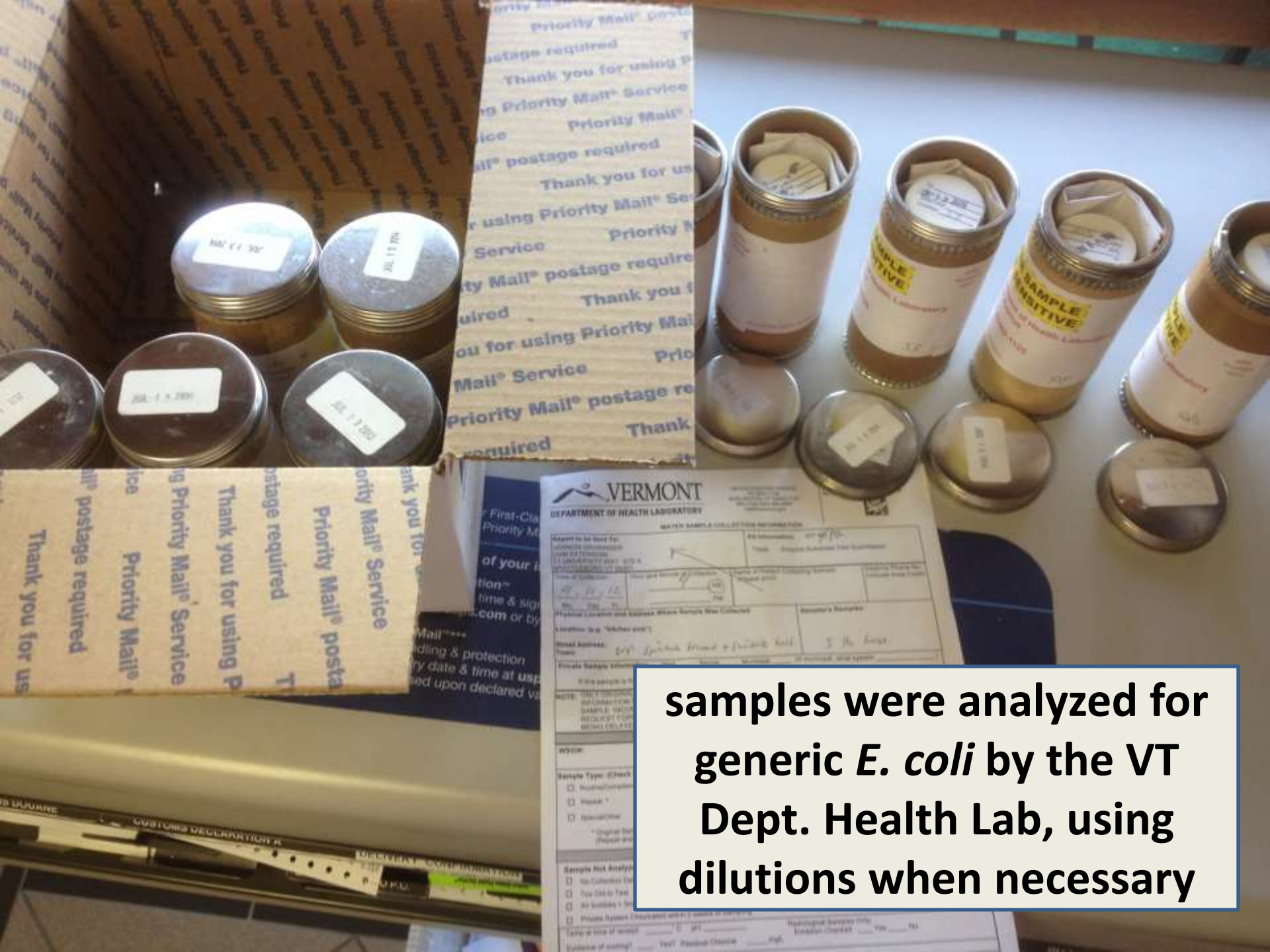

triple stainless

series of stainless sinks

triple tubs with net system for transfer

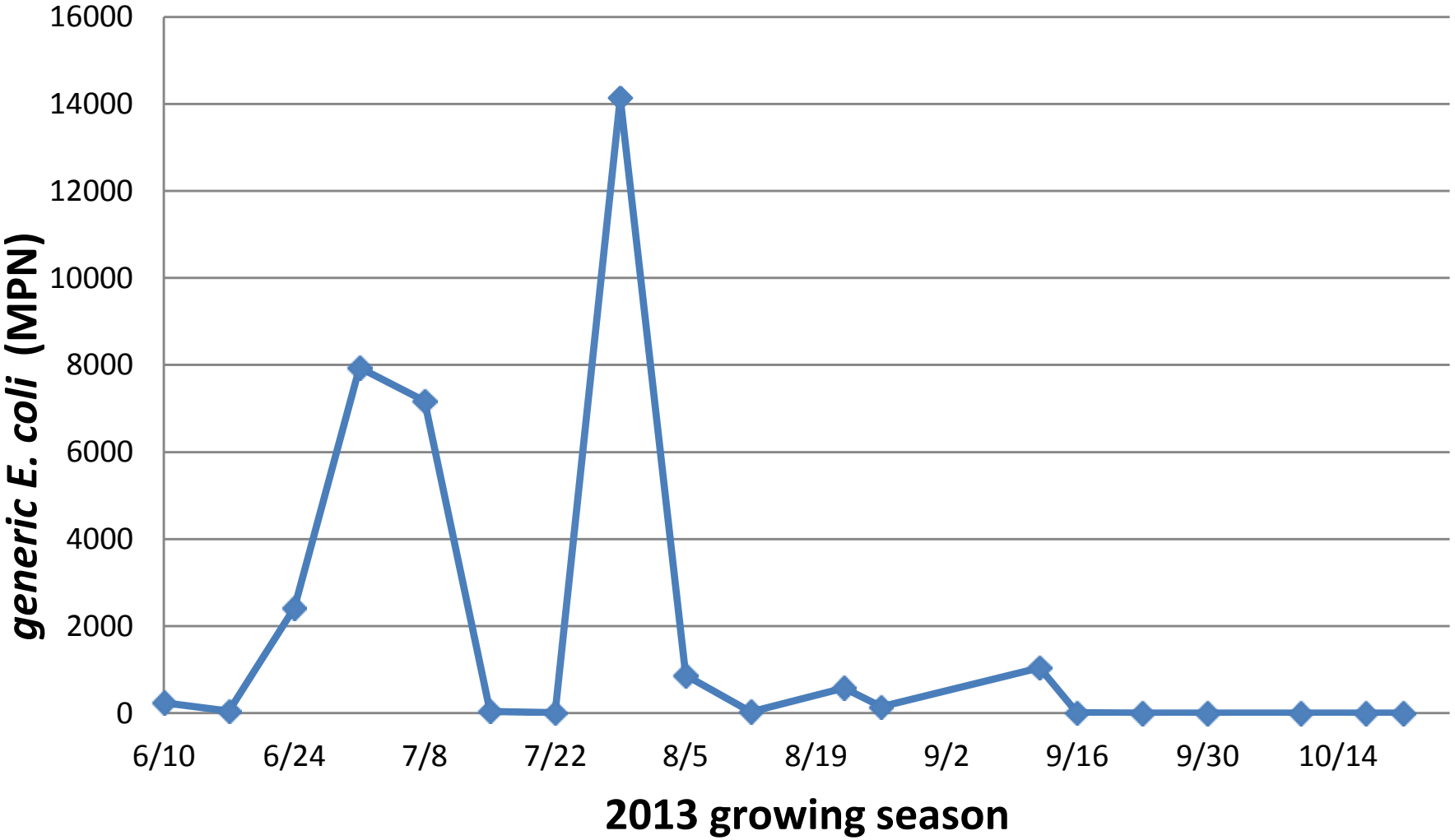

automated, stainless and food grade plastic

Dr. Lynn Blevins and I sampled wash water from 4 farms during the 2012 and 2013 seasons

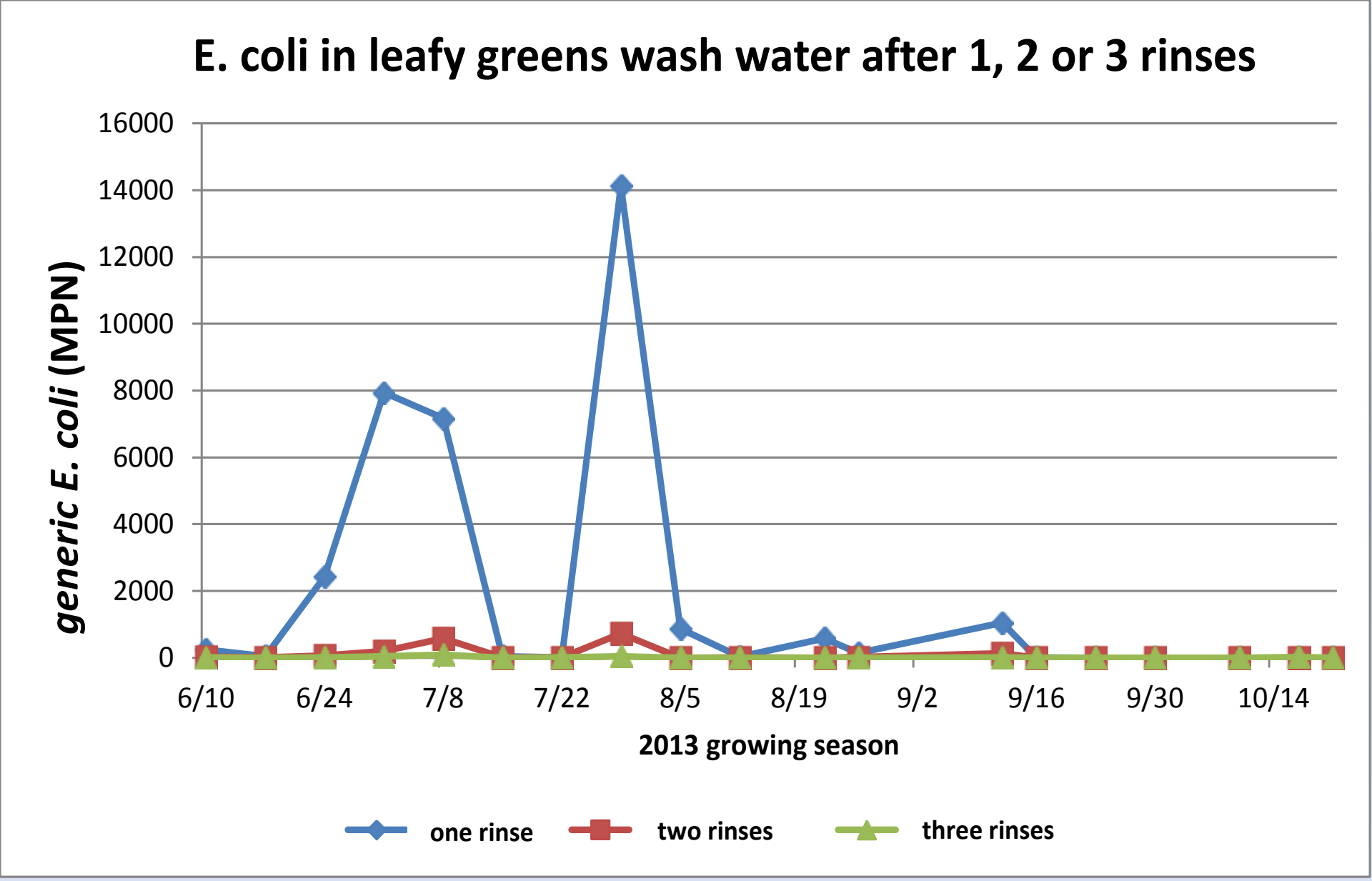


samples were analyzed for generic *E. coli* by the VT Dept. Health Lab, using dilutions when necessary

E. coli in leafy greens wash water after one rinse



one farm, 24 heads of lettuce, 10 gallons water per rinse



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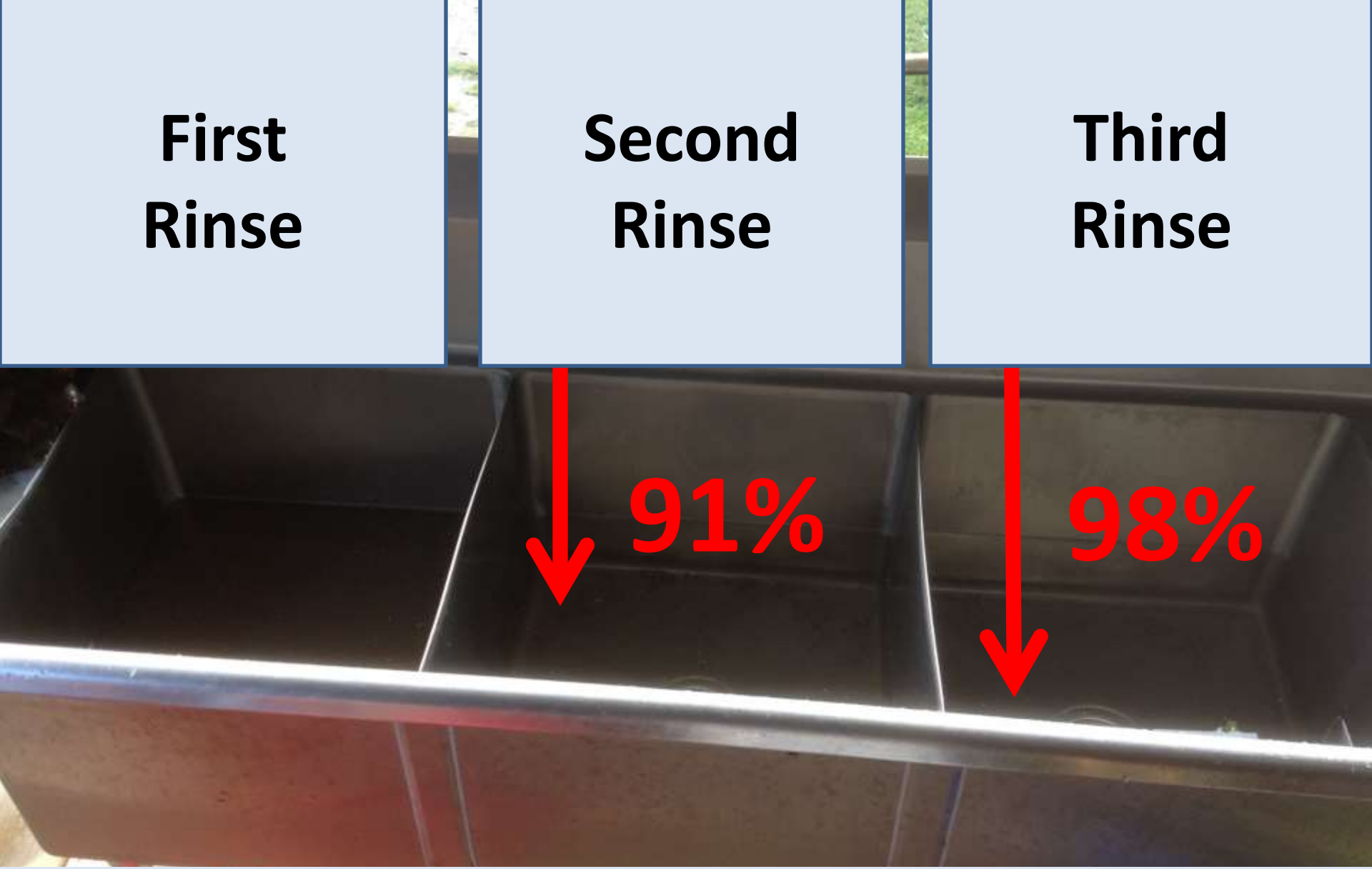


Average reduction of *E. coli* in leafy greens wash water, compared with a single rinse

Hydrogen Peroxide 23%; Peracetic Acid 5.3%

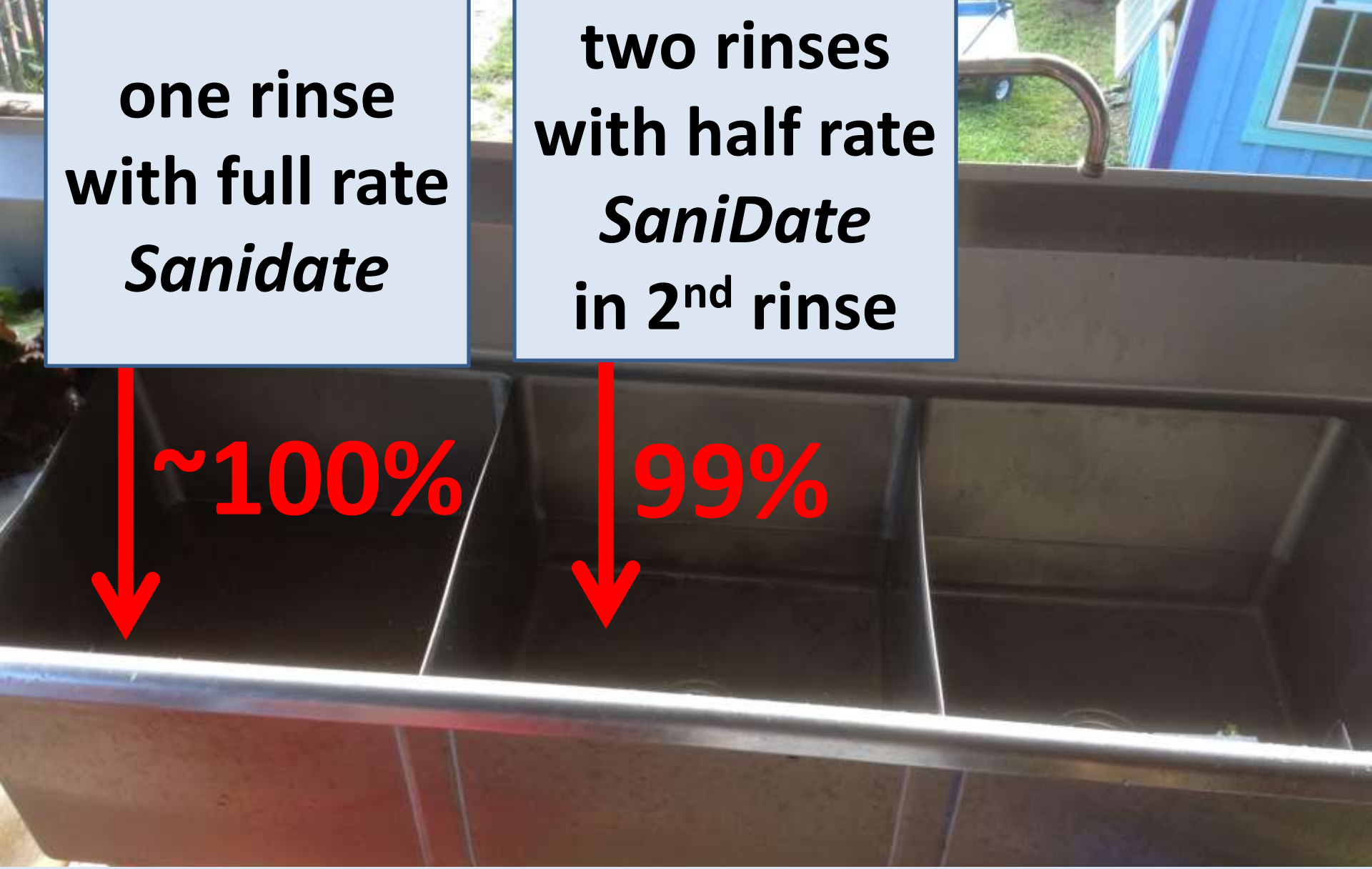
Labeled for vegetable wash water

OMRI-labeled for organic production

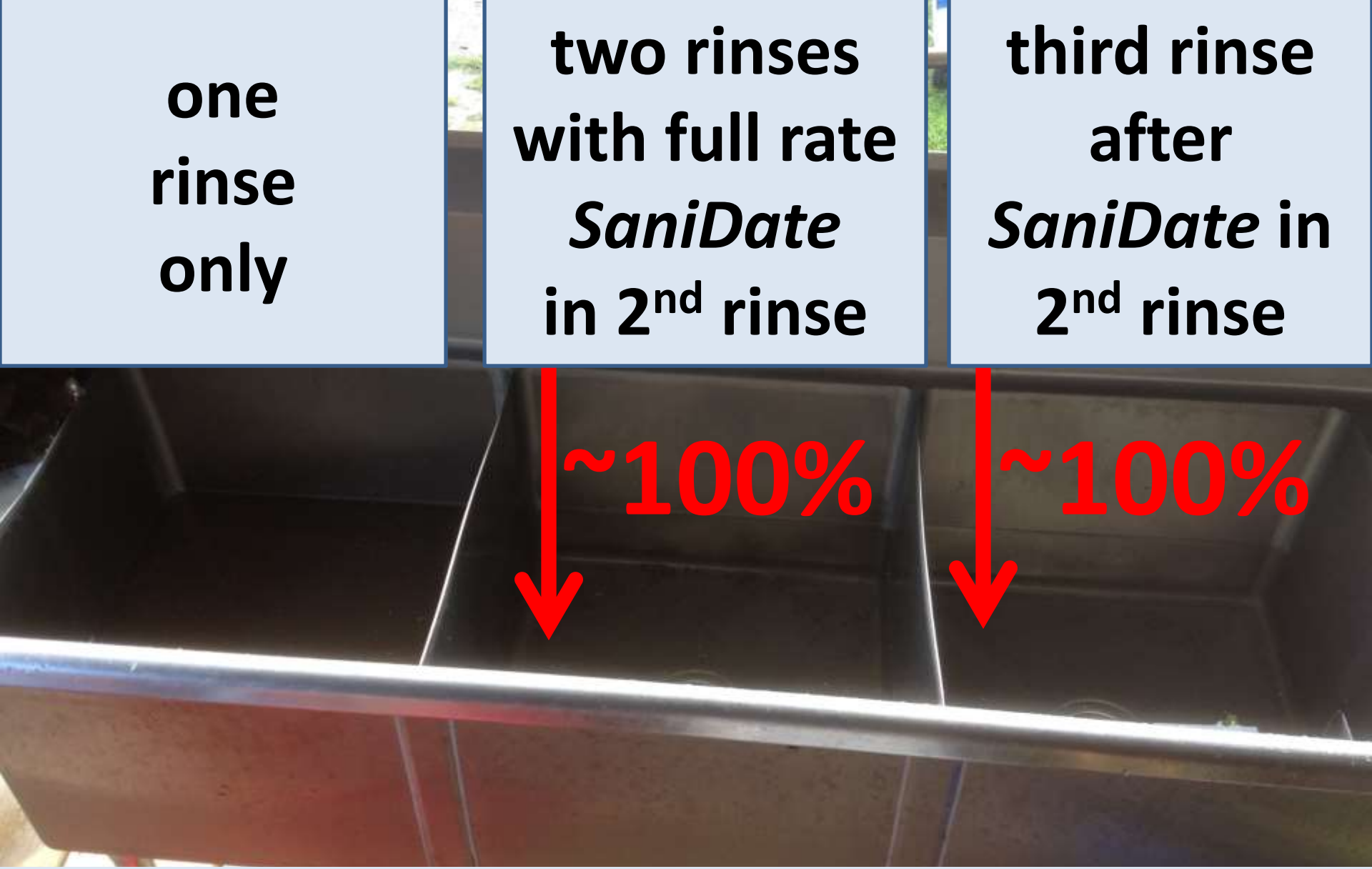
full rate = 5 fluid oz. / 100 gal. wash water

(The most recent label for this product lists rates of 6 to 20 fluid oz. / 100 gal. of vegetable wash water)

This information is provided for educational purposes and is not a product endorsement nor does it suggest that other products are not equally effective. Always follow the label.



Average reduction of *E. coli* in leafy greens wash water with SaniDate 5.0, compared with a single rinse



Average reduction of *E. coli* in leafy greens wash water with SaniDate 5.0, compared with a single rinse

key areas of concern
(around draft FSMA rules)

photo: http://gutschurch.com/

definition of ‘food’


agricultural water

biological soil amendments

personnel training

on-farm processing

cooperative marketing

oversight and credibility of ‘exempt’ farms

research on ‘alternative farm practices’ is needed

The proposed rule would allow farms to establish alternative practices…and still be in compliance with the rule…. if adequate scientific data or other information demonstrates those alternatives provide the same level of public health protection as the rule.

Source: FDA http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334552.htm#alternatives_variances

food safety ‘accreditation’ is needed for ‘small scale farms!

THE END