E. Coli O157:H7 and Spinach
2006

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Number of cases of E. coli O157:H7 reported in California - 2000-2005
Surveillance, Reporting, and Investigation of Foodborne Illnesses/Outbreaks in California

Infection with pathogen

Symptomatic

Collect sample

Lab isolation/identification

Report to state

Cluster/Outbreak/Increase?

Investigate

Source, mode, vehicle

CDC data estimates that for every reported case of O157, approximately 20 are unreported.
Letter from FDA to California Firms that Grow, Pack, Process, or Ship Fresh and Fresh-cut Lettuce November 4, 2005

“FDA is aware of 18 outbreaks of foodborne illness since 1995 caused by *Escherichia coli* O157:H7 for which fresh or fresh-cut lettuce was implicated as the outbreak vehicle. In one additional case, fresh-cut spinach was implicated. These 19 outbreaks account for approximately 409 reported cases of illness and two deaths. Although tracebacks to growers were not completed in all 19 outbreak investigations, completed traceback investigations of eight of the outbreaks associated with lettuce and spinach, including the most recent lettuce outbreak in Minnesota, were traced back to Salinas, California.”

Letter from California State Health Officer to Western Growers – January 2006
CDHS Activities in Lettuce

- Met with lettuce industry numerous times over the last 2-3 years to attempt to obtain commitment from industry leaders to address the problem.
- Established California Food Emergency Response Team with FDA to promptly and thoroughly investigate outbreaks. Provided training in environmental investigations to team members.
- Established multiagency workgroup to conduct Environmental Sampling Project in the Salinas area.
- Helped write successful USDA grant to expand Environmental sampling project.
- Convened and coordinated workgroup composed of industry, FDA, FDB, and academia to produce a video entitled "Safer Processing of Fresh Cut Produce“.
- Requested FDA to review and summarize all previous lettuce associated outbreaks.
- Met with local and federal officials to develop, coordinate, and document state, local, and federal efforts.
- Participate in WIFSS Lettuce Advisory Committee.
- Sent letter to Western Growers advising them of CDHS’ concern and urging additional actions.
- Participate on Fresh Express Technical Advisory Committee.
- Developed and began implementing Lettuce Safety Initiative.
E. Coli O157:H7 and Spinach

CDHS notified of multistate investigation possibly linked to spinach on Sept 14. Thirty three PFGE matching isolates from 13 states.

Illnesses in WI and OR were finding that most of the cases recalled eating bagged spinach.

California Food Emergency Response Team investigators dispatched on Sept 14 to three possible firms identified in the early epi information.

Natural Selections Foods in San Juan Batista, California initiated a voluntary recall on Sept. 15.
STATE HEALTH OFFICER ANNOUNCES VOLUNTARY RECALL OF FRESH, PREPACKAGED SPINACH PRODUCTS THAT ARE POSSIBLY RELATED TO A MULTISTATE OUTBREAK OF E. COLI

SACRAMENTO – State Public Health Officer Dr. Mark Horton announced today the voluntary recall of fresh, prepackaged spinach products manufactured by Natural Selection Foods of San Juan Bautista that are possibly related to a multistate outbreak of E. coli O157. Horton also confirmed one California illness associated with the outbreak: a Shasta County adult who was hospitalized and is recovering at home.

“While the source of the contamination is still under investigation, Natural Selection Foods is voluntarily recalling its fresh, prepackaged spinach products as a precaution,” Horton said. “Consumers should not eat any fresh, prepackaged spinach until the source of the contamination that is causing this outbreak is determined.”
# E. Coli O157:H7 and Spinach

<table>
<thead>
<tr>
<th>#</th>
<th>Onset Month</th>
<th>Yr</th>
<th>State and County Where Outbreak Occurred</th>
<th>Ill</th>
<th>Hospitalized</th>
<th>HUS/TTP+</th>
<th>Deaths</th>
<th>Setting (Include As Much Detail as Possible)</th>
<th>Known or Suspected Transmission Route</th>
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- Early epi investigation findings could not definitively identify a single firm or lot code.
- Using the best available information at the time, investigators targeted three possible processors for review.
• As more epidemiologic information was obtained over the next couple of weeks, the investigation focused on a single lot code (P227) of Dole Baby Spinach manufactured by Natural Selections Foods.

• Within three weeks from the beginning of the investigation, California Food Emergency Response Team investigators were able to determine that four farms supplied spinach for the single lot code and were able to initiate investigations on these four farms.
E. Coli O157:H7 and Spinach

- 204 confirmed cases in 26 states
- 1 confirmed case in one Canadian province
  - 104 hospitalizations (51%)
  - 31 Hemolytic Uremic Syndrome (15%)
  - 3 deaths
E. Coli O157:H7 and Spinach

1-4 cases
5-9 cases
10-14 cases
15 or higher
Thursday, October 5, 2006
E. Coli Kills Idaho Toddler; Spinach Plants Probed

Thursday, October 12, 2006
E. Coli Strain in Tainted Spinach Is Linked to California Cattle Ranch

Thursday, October 12, 2006
Source of Deadly E. Coli Is Found
Samples

Approximately 800 Environmental Samples Collected to date by the California Food Emergency Response Team.

- water, soil/sediment, cow and wild pig feces, field product, finished product

Preliminary Results:

- \textit{E.coli} O157:H7 positive samples found on all 4 ranches

- 9 of these samples from one ranch are a PFGE match with the outbreak strain (1 = water, 1 = wild pig feces, 7 = cow feces)
DHS, USDA-ARS, and UC Davis grant to study O157 in the environment

North looking South
Lessons Learned

- Water, wildlife, workers, and manure are still the four most frequently identified risk factors in leafy green associated outbreaks.
- Research needs have been identified and prioritized.
  - No need to reinvent the wheel.
  - No need to focus on esoteric topics until the basic questions are answered.
  - We will never have all the answers and should not give any credence to those who say “wait until the science gives us the answers”. We know enough now to take some measured steps toward actively implementing risk reduction measures.
- Specialized training and dedicated resources in farm investigations and traceback investigations will help tremendously.
- In order to have a realistic chance of identifying the source, a very large number of environmental samples will need to be collected and analyzed using experienced, qualified microbiology labs with the most sensitive methods.
- Our understanding of the microbial ecology of O157 on farms in the Salinas Valley is extremely limited. New sampling and high throughput testing methods should be encouraged (in parallel with traditional methods).
- For streams/running water, Moore swabs, left for several days, generally is a far superior approach than one liter/one gallon grab samples.
Current Efforts/Next Steps

- Continue efforts to determine the precise source and vehicle/vector for contamination of the spinach.
- Encourage industry to establish a standardized, verifiable, scientifically based on-farm good agricultural practices system that is implemented on 100% of farms 100% of the time.
- Participate in CSREES grant/study to look for O157 in water in the Salinas Valley.