STEC O104 outbreaks in Germany and France: EFSA’s response and lessons learnt
Causative organism (I)

- **Shiga-toxin producing* Escherichia coli* (STEC) serotype O104:H4 and carries substantial antibiotic resistance.

- **Reservoir**: not clear –
  - shares virulence characteristics of STEC (animal reservoir) and of enteroaggregative *E.coli* (EAEC) (human reservoir) strains.

- **Origin**: Previously very rare in Europe
  - 10 cases of STEC O104 infection reported to ECDC (2004-2010): only **three** were of serotype O104:H4 (Finland 2010, Italy 2009 and France 2004): travel in North Africa
  - A review of the literature revealed that STEC O104:H4 has also been isolated in Germany, **twice** (2001). German isolates differed from the 2011 outbreak strain
Epidemic (I)

-Germany
  First case 1st week of May
  Epidemic peak 200 cases per day: 22 May

-European level
  Germany reports to Commission and MS on 21 May
  First audio conference of Commission 24 May

-France
  24 June cluster in Bègles (near Bordeaux)

-7 July end of the outbreak
  4000 cases, incl. 50 deaths
Epidemic (II) - German outbreak

Source: Robert Koch Institute, Technical Report - EHEC/HUS O104:H4 Outbreak, 30.06.2011
EFSA’s Involvement

• First phase (May 24 – 8 June): Preparatory Review
  – EFSA/ECDC advice published 3 June
  – Literature Review: presence of enteric pathogens in plant material
  – Summarisation of STEC data previously reported in the EU in humans, food and animals

• Second phase (5 – 16 June): Support Outbreak Investigation in Germany
  – Worked ‘shoulder to shoulder’ with the colleagues from the Federal Ministry and Research Institutes and the Länder to develop, set up and implement the tracing back and tracing forward investigation
  – Led to the identification of sprouts as the cause and Establishment A as the source of the sprouts

• Third phase (24 June – 5 July): Investigate common cause between French and German outbreaks
  – Set up a European Task Force to trace common link: seeds used to produce sprouts
  – Identified a Lot of Fenugreek seeds imported from Egypt in Germany via Antwerp/Rotterdam

• Fourth phase: follow-up mandate to BIOHAZ Panel (30 Oct)
OUTBREAK INVESTIGATION:

This is like peeling an onion (in a hurry): as soon as have peeled one layer you are merely ready for the next

- It is a stepwise and complex process:
  - Which is the vehicle – fresh vegetables
  - Which fresh vegetable is it really – sprouts
  - Where do those sprouts come from – from Establishment A
  - Which of the sprouts from Establishment A – can’t tell for sure
  - How do these sprouts get contaminated:
    - personnel?
    - water?
    - seeds?
- It comes with ‘a lot of tears’:
  - The pressure is, understandably, enormous
  - The need for coordination of various organisations is substantial
  - The rule-book has not been written or rehearsed and many existing rules may take weeks
  - Mistakes can be made, when time is of the essence
Consumption Advice: eat no cucumbers, tomatoes, lettuce in Northern Germany

Sweeping inspection of the wholesale market in Hamburg

MAY

20 21 22 23 24 25 26 27 28 29 30 31

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EHEC Task Force

RKI case control study in Hamburg

Strong human outbreak signal

Revised Consumption Advice: eat no raw sprouts

JUNE

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Detailed report to COM on 5 outbreak clusters

Trace Back Study

Trace Forward Study

26 Clusters linked to sprout producer

41 Clusters linked to sprout producer

Trace Forward Study

Detailed report to COM on 5 outbreak clusters

Trace Back Study

Source: Federal Office of Consumer Protection and Food Safety (BVL)
41 well described outbreak clusters with a common link

- Further epidemiological investigations linked disease occurrence with either of 2 sprouted seed mixtures:
  - Mild blend: 4 types of sprouts
  - Spicy blend: 3 types of sprouts

- Only lentil and fenugreek sprouts were common to both mixtures.

Source: Federal Office of Consumer Protection and Food Safety (BVL)
Epidemic - French outbreak

• Before French outbreak, 13 EU/EEA countries reported cases associated to the outbreak in Germany. All cases linked to travel to northern Germany.

• 24th June France reported a cluster of patients with bloody diarrhoea: none of the food handlers or guests had recently travelled to Germany or had contact with travellers from Germany.

• **Microbiological characterization** of the isolates from **French outbreak**: indistinguishable
EFSA’s Task Force

• 25th June EFSA asked by the European Commission to initiate tracing back investigation to identify possible link between French cluster and German outbreak?

• EFSA set up a Task Force composed of experts from European Commission, concerned MS (Germany, France, United Kingdom, the Netherlands, Italy, Sweden, Austria and Spain), ECDC, WHO, and FAO.

• EFSA data collection, data management and data analysis using spreadsheets developed for German outbreak. Rapid Alert System for Food and Feed (RASFF) for data exchange. Collaboration with German EHEC Task Force members: Exchange of staff from the BfR
EFSA Task Force: Link between German and French outbreaks

Exported from Egypt
Fenugreek seeds
Quantity: 15,000 kg
Date: 24/11/2009

Importer in Germany
In: 15,000 kg
Date: 15/12/2009
Lot no.: 48088
(via Antwerp, through Rotterdam by ship)
Storage: 75 kg
Out: 15,075 kg
Lot no.: 6832

Seed supplier/repacker in United Kingdom
In: 400 kg
Date: 13/01/2010
Lot no.: 6832
Storage: 305 kg
Out: 1917 x 50g
Lot no.: DRG1041132/10

Distributor in France
In: 1917 x 50g (95 kg in total)
Date: Jan, 2011
Lot no.: DRG1041132/10
Out: to about 200 shops
Art. no.: 06410838

One Cluster in France
In: 1 x 50g (1 packet)
Date: 08/06/2011
(infection)
Lot no.: DRG1041132/10
4 STEC O104:H4 pos.

Sprout Producer Establishment A
In: 75 kg
Date: 10/02/2011
Lot no.: 0104350
Out: 75 kg
(Lot 8266 also received by this establishment)

- 41 Clusters in Germany
  Date: April/May 2011
  >300 cases of HUS or STEC O104:H4 pos.

Investigation completed without positive bacteriology

- The outbreak strain was not isolated from seeds or sprouted seeds.

- The outbreak strain has not been isolated from foods where the possibility of cross-contamination could be excluded.

- The lack of positive microbiological results is not unexpected:
  - Test sensitivity for very low levels of contamination
  - Sampling volumes стрategies for low contamination levels,
  - Possibly heterogeneously distributed in large lots.
  - Specific physiological considerations due to the seed matrix; soaking seeds prior to testing may aid recovery of contaminants (ANSES and EU-RL)
Complete Forward tracing

Fenugreek seeds batch from 2009 (batch 48088)

CONCLUSIONS

• Lot 48088 of fenugreek seeds imported from Egypt was the common link for both outbreaks. Possible implication of other lots. **Import ban**

• While the **trace-forward activities** were ongoing, consumers were advised not to grow sprouted seeds for consumption and not to eat sprouts or sprouted seeds, unless they were cooked thoroughly. When the trace-forward was completed and the implicated lot(s) removed from the market, such advise was revised (**3rd October, EFSA website**) (http://www.efsa.europa.eu/en/press/news/111003a.htm)

• Contamination with STEC O104:H4 with faecal material of human and/or animal origin during production or distribution process. Typically, such contamination occurs during production at farm level. **Mandate to BIOHAZ panel**