Outbreak of staphylococcal food poisoning among children and staff at a Swiss boarding school due to soft cheese made from raw milk

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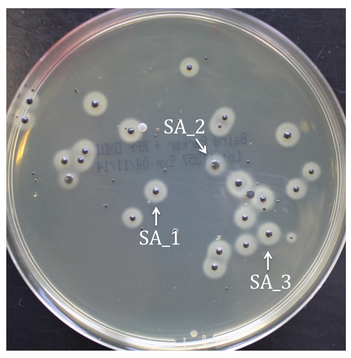
Background

On October 1, 2014, children and staff members at a Swiss boarding school consumed Tomme, a soft cheese produced from raw milk. Within 7 h, all 14 persons who had consumed the cheese fell ill, among them 10 children and 4 members of the staff. Based on the short incubation time, as well as the clinical symptoms, SFP due to consumption of the raw milk cheese was considered a possible cause of the outbreak.

Objective

We aim to present a food poisoning outbreak and to characterize its causative agent.

Bacterial isolation & enumeration



1:1,000,000 dilution

Rabbit plasma fibrinogen agar was used for enumeration of coagulase-positive staphylococci (CPS). In total, the cheese contained 10^7 CfU CPS/g. Interestingly, **three differrent *S. aureus* strains** (SA_1, SA2, and SA_3) were **present at levels > 10^6 CfU/g.**

Enterotoxin detection

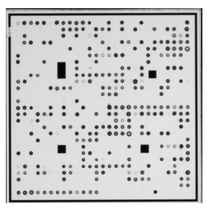
- SET2 mini Vidas was used to screen the cheese for SEA-SEE.
  => SEA+ and SED+
- We determined by SET-RPLA that the cheese contained:
  > 6 ng of SEA/ g
  > 200 ng of SED/ g

Outbreak data

- *S. aureus* was isolated using rabbit plasma fibrinogen (RPF) agar, following EN ISO 6888-2 protocol.
- Source: Tomme raw milk cheese
- 14 patients (10 children, 4 adults)
- Symptoms: abdominal pain, emesis, (bloody) diarrhea, fever
- **Incubation time:** **2.5 h (children <10y)**
  3.5 h (children >10y)
  7 h (adults)

Microarray-based genotyping

All three *S. aureus* strains isolated from the Tomme cheese were characterized by DNA microarray analysis.



	major SE genes	newly described SE genes	*spa* type	*agr* type	clonal complex
SA_1	***sea, sed***	*sej, ser*	t711	I	CC8
SA_2	none	*egc*	t018	II	CC705
SA_3	none	*egc*	t458	III	CC20

We identified *S. aureus* SA_1 as the source of the outbreak.

SA_1 exhibited characteristics of a **genotype B** strain. This genotype comprises bovine *S. aureus* strains exclusively associated with very high within-herd prevalence of mastitis and has been described as a major contaminant in Swiss raw milk. It is highly likely that the raw milk used for Tomme production was heavily contaminated with *S. aureus.*

Conclusions

1) The outbreak was caused by Tomme raw milk cheese contaminated with an *S. aureus* strain producing **SEA** and **SED**.
2) The outbreak was caused by a **genotype B** strain, a genotype exclusively linked to high within-herd prevalence of mastitis.
3) **The incubation time depended on the age of the patient.**

Details on this study are also available online:
Johler et al., 2015. Outbreak of staphylococcal food poisoning among children and staff at a Swiss boarding school due to soft cheese made from raw milk. Journal of Dairy Science 98: 1-5.