

Unusually severe food poisoning from vanilla slices

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SUMMARY

Thirty six people suffered from severe vomiting and diarrhoea 15 min to 3 h after eating vanilla slices from the same bakery. Five patients were admitted to hospital, and one developed unusual skin lesions after admission. *Staphylococcus aureus* was isolated in large numbers from vanilla slices of the same batch as those giving rise to symptoms, and from five faecal specimens obtained from affected persons. *Bacillus cereus* and *Bacillus subtilis* were also isolated from the slices. Unbaked custard provides an ideal environment for bacterial multiplication, especially when (as on this occasion) the ambient temperature is persistently high.

INTRODUCTION

Vanilla slices have been implicated in food poisoning outbreaks in the past, and indeed these cakes seem to possess a 'normal flora' (Pinegar & Buxton, 1977). Methods of production may not eliminate organisms present in the ingredients or added during mixing, and if temperature conditions are favourable these products provide an excellent opportunity for bacterial multiplication. This may result in spoilage, but if the organism in question produces a powerful enterotoxin the result may be severe food poisoning. We describe here an outbreak of food poisoning following consumption of vanilla slices with strong evidence that *Staphylococcus aureus* enterotoxin A was responsible either alone or in combination with *Bacillus cereus* and *Bacillus subtilis*. The outbreak involved severe symptoms in a few people but considerable anxiety in the city and a sharp decline in custard confectionary sales during the following weeks.

THE OUTBREAK

1. *The patients*

On a Saturday evening in July 1983, during unusually warm weather, a General Practitioner reported to the Environmental Health Department exceptionally violent onset of diarrhoea and vomiting in two unrelated patients who had in

common that they had eaten vanilla slices. Thirty-four others became ill that evening. The onset of symptoms ranged from 15 min to 3 h after consumption of the food. Five people became ill within less than half an hour. So sudden and uncontrollable was the onset in some cases that the investigating Environmental Health Officer reported soiling of carpets and walls with vomit and faeces in otherwise well-kept houses. Five patients required hospital admission and three of these needed intravenous fluid replacement. All except the case described below recovered within 24 h.

2. *An unusual case*

A 34-year-old, 7-months pregnant woman was admitted to hospital. Her history was of vomiting (up to 20 times), starting 3 h after eating a vanilla slice, and of severe colicky abdominal pain. Two hours after the onset of vomiting she began to have watery, bloody diarrhoea with her bowels opening about 30 times. These symptoms gradually settled overnight and she reported feeling hot and cold over this period. On admission she was slightly dehydrated but there were no problems associated with her pregnancy. On the day after admission five septic spots appeared on her legs. Her white blood count was elevated at $17.7 \times 10^9/l$. A swab of the spots was obtained and treatment with intravenous flucloxacillin 500 mg 6-hourly commenced. Two more spots appeared on the following day but all gradually faded and had disappeared by the fourth day after admission. She was then discharged well on a five-day course of oral flucloxacillin, to the care of her General Practitioner.

3. *Public Health measures*

On the Sunday (within 24 h of the first case occurring) the Environmental Health Department made a public announcement over local radio warning of the possible dangers of eating vanilla slices and naming the supplying bakery.

It is estimated that 72 of the 15 dozen slices made would have remained unsold and others may well have been destroyed by purchasers who had heard the radio alert. Samples of slices were obtained for laboratory investigation, and patients were interviewed by the investigating Environmental Health Officer who also requested faecal samples from them.

A visit to the bakery revealed that the slices had been prepared at 10 am on the Friday. Custard was made by mixing powder with boiling water and the mix was left to cool, then poured into pastry cases, sliced by hand and left at ambient temperature to await collection by delivery van drivers at 5 am on Saturday. At the beginning of the working day they were placed in window or counter displays until sale. At no time between manufacture and sale were the slices refrigerated. This method of preparation and distribution had been used by the bakery for the past 25 years.

The maximum and minimum shade temperatures in Sheffield during the period in question were 28.9 °C (84 °F) and 17.3 °C (63.1 °F). Examination of the bakery staff revealed one food handler who had an eczematous lesion on his hand. This was swabbed and nasal swabs were obtained from all staff.

LABORATORY INVESTIGATIONS

1. *The vanilla slices*

Fifteen dozen slices were manufactured on the day in question; four were obtained for examination. The samples of custard filling from the slices had total viable counts at 37 °C of greater than 1×10^9 /g. These organisms were mainly *S. aureus* (highest count 1.3×10^9 /g) but included coliforms, *B. cereus* (untypable) and *B. subtilis* in numbers up to 2.6×10^6 /g. The isolates of *S. aureus* were subsequently shown to produce enterotoxin A, and two samples of vanilla slices were shown to contain 1–5 µg enterotoxin A/100 g of slice.

2. *The patients*

Faecal specimens were obtained from 22 patients. Five yielded growths of *S. aureus*. Four of these isolates were of the same phage type (53/85) as the vanilla slice isolates. One was of different phage type (42E). The four isolates of phage type 53/85 were shown to produce enterotoxin A. The swab of septic spots from the case described yielded a growth of *S. aureus* which was of phage type 53/85 and produced enterotoxin A.

3. *The bakery staff*

The swab from the eczematous lesion on the hand of a member of the bakery staff yielded a heavy pure growth of a *S. aureus* which was of phage type 42E and did not produce enterotoxin A. None of the nasal swabs yielded *S. aureus* of phage type 53/85 or 42E.

DISCUSSION

Fifteen minutes is a remarkably short incubation period for any form of bacterial food poisoning and indeed the possibility that this was chemical poisoning was uppermost in the minds of the investigators originally. The demonstration of enterotoxin A is strongly indicative of staphylococci being the cause although in such cases the onset is not usually so early. (Gilbert, 1974) It is possible that the speed of onset was related to the combined effects of more than one organism and/or their products; food poisoning of mixed aetiology has been described (Jephcott *et al.* 1977). The presence of large numbers of *Bacillus* species may well have contributed to the picture, particularly in the cases where the onset of symptoms was within less than half an hour of eating. In food poisoning attributed to *B. subtilis* the incubation period is often very short (Kramer *et al.* 1982). The attack rate in this outbreak is impossible to calculate as it is not known how many of the suspect vanilla slices were disposed of without being eaten. Media coverage of the outbreak was swift and helped to contain it.

Some members of families ate slices and remained well, whereas others in the same family were severely affected. This may reflect individual susceptibility but it might be that only a part of the batch was contaminated.

The ambient temperature in Sheffield that weekend was very high and this fact assumes great importance when refrigeration facilities are not available for large quantities of food, as is common in the retail food trade.

Salmonellae have received a lot of attention as the cause of food poisoning.

S. aureus is a less commonly reported cause of food poisoning and for that reason has received less publicity. This is illustrated by the fact that bakery workers were aware of the need to report any symptoms of diarrhoea but were ignorant of the possible danger of handling food while suffering from septic lesions.

It is not clear why the 34-year-old woman developed septic spots. Development of such lesions on the skin is a curious result of ingesting *S. aureus* in food, although the skin may have been contaminated when she had diarrhoea. The possibility remains that the patient had a transient bacteraemia.

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