



BC Centre for Disease Control  
An agency of the Provincial Health Services Authority

# Fact Sheet: 1988 and 1989 *Bacillus cereus* Outbreaks in Milk and Milkshakes

## Outbreak highlights:

Outbreak <sup>1</sup>	Number ill	Where it occurred	Date of outbreak	Products contaminated
A	36	Ontario fast food restaurant	July 1988	Milkshakes and milk
B	74	Quebec school	1989	Milk

Outbreak A: Five days after 36 people became ill from consuming milkshakes at an Ontario restaurant, another individual became ill after consuming milk at their workplace. In both incidents, the product contained more than 100,000 *Bacillus cereus* per gram.

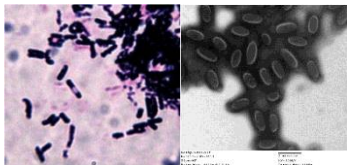
Outbreak B: Between 1.8 to 8 million *Bacillus cereus* organisms were detected per gram of milk. Temperature abuse and poor stock rotation were cited as causing this outbreak.

These conditions likely contributed to these outbreaks:

- ✘ The unpasteurized product must have contained *Bacillus cereus* spores.
- ✘ The product must have been pasteurized (precludes competitors).
- ✘ The product must not have been re-contaminated before or during packaging (competitors not reintroduced).
- ✘ The product must have been temperature abused (allowed growth of *Bacillus cereus*).

The rationale for this is explained below.

## Organism of concern:



*Bacillus cereus* is a spore forming bacterium commonly found in small numbers in the

environment. Ingestion of more than 100,000 organisms per gram of food or its toxins can cause illness. Symptoms including nausea, diarrhoea, and/or vomiting, may occur between ½ hour and 24 hours after eating contaminated food. Symptoms rarely last more than 24 hours.

## Significance to Dairy Industry

The presence of *Bacillus cereus* spores in milk is unavoidable. This pathogen produces both a toxin and spore capable of surviving pasteurization. *Bacillus cereus* will grow at 5°C, only slightly above refrigeration temperature. Therefore, even slight temperature abuse over the shelf life may render the product unsafe.

Because *Bacillus cereus* spores survive the pasteurization process, they will be present in some containers of dairy product.

Illness outbreaks associated with *Bacillus cereus* in dairy products are rare because:

- ✓ Proper refrigeration prevents its growth.
- ✓ It is a poor competitor so it does not compete well with other organisms.
- ✓ Milk usually spoils due to psychrotrophic spoilage bacteria before it becomes a health risk.

Fortunately, the general public, including industry, are aware that dairy products must be refrigerated. Further, dairy products normally spoil before *Bacillus cereus* contamination is sufficient to cause illness. Two factors affect risk of *Bacillus cereus* in milk causing illnesses: (1) increasing shelf-life (best before dates are extended), and (2) improper storage temperatures (above 5°C).

### Preventing issues in the dairy plant

- ✓ Maintain dairy products below 4°C through-out the distribution chain.
- ✓ Effectively wash equipment.
- ✓ Avoid re-pasteurizing product.
- ✓ Ensure returned product is well marked and segregated from saleable product to prevent accidental shipment of returned product.
- ✓ Do not extend best before dates on milk products without properly conducting shelf-life testing.

### References

1. Personal communication. 2015. BC Centre for Disease Control.

Environmental Health Services

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