

# Foodborne Illness Outbreaks

## Bacillus cereus

### What is Bacillus cereus?

Bacillus cereus is a spore forming bacteria 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, diarrhea, and/or vomiting, may occur between ½ hour and 24 hours after eating contaminated food. Symptoms rarely last more than 24 hours.

### What is the Significance of this Organism to the 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 a sixteen-day shelf life may render the product unsafe.

### Are Outbreaks Common?

No! 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. However, as the bacterial quality of pasteurized milk improves and the 'best before' date is extended the odds of a Bacillus cereus outbreak increase.

### Have Outbreaks Occurred?

Yes! In July 1988, 36 people became ill from consuming milkshake at a fast food restaurant in Ontario. Five days later, another individual became ill after consuming milk at their workplace. In both incidents, the product contained more than 100,000 Bacillus cereus per gram.

In 1989, 74 individuals became ill after consuming milk at a school in Quebec. Between 1.8 - 8 million Bacillus cereus organisms were detected per gram of milk. Temperature abuse and poor stock rotation were cited as causing this outbreak.

### Any Comments?

Yes! 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 before it becomes a health risk.

The following conditions must have been in place for these outbreaks to occur:

- the unpasteurized product must have contained Bacillus cereus spores.
- the product must have been pasteurized (precludes competitors).
- the product must not have been recontaminated before or during packaging (competitors not reintroduced).
- the product must have been temperature abused (allowed growth of Bacillus cereus).

### Suggestions to Prevent Bacillus cereus Outbreaks.

1. Maintain dairy products below 4°C.
2. Effectively wash equipment.
3. Avoid re-pasteurizing product.
4. Never rework products that have left the plant.
5. Ensure returned product is well marked and stored well away from saleable product to prevent accidental shipment of returned product.

For further information contact the Dairy Plant Specialist at Food Protection Services  
604.707.2440

