

Foodborne Illness Due To *Bacillus* Species Other Than *B. cereus*

Although *B. cereus* is the most common species of *Bacillus* associated with food poisoning, a range of other species have been implicated in foodborne illnesses. The two most commonly reported species are *B. subtilis* and *B. licheniformis*. These species are of concern to the food processing and canning industries as they are often implicated as causes of food spoilage producing potent proteolytic and saccarolytic enzymes (1). In addition, a range of other species including *B. pumilus*, *B. brevis* and *B. thuringiensis*, have also been reported as being the sole species implicated in outbreaks of food poisoning. Using cell cytotoxicity assays *B. lentus*, *B. circulans*, *B. mycoides*, *B. polymyxa* and *B. laterosporus* have also been demonstrated to produce toxins whilst some of these species have also been shown to produce positive RPLA and TECRA™ assays (2,3).

B. subtilis is the most frequently reported species associated with food poisoning other than *B. cereus* (1), being associated with outbreaks involving meat, pastry products, seafood and rice. Incubation periods varied from 1 – 4 hours, with recovery generally complete within 24 hours. Symptoms usually included nausea and vomiting. Diarrhoea was rarely reported.

B. licheniformis (1) associated food poisoning resembles that of *C. perfringens*, with an incubation period of 6 – 24 hours and symptoms including diarrhea and abdominal pain. In cases of food poisoning associated with *B. licheniformis*, high numbers of the bacteria (10^6 cfu/gm) were found in the implicated food (often cooked meat and vegetable dishes) and in the faeces of affected persons. Toxin producing strains of *B. licheniformis* have been reported (4).

B. pumilus was implicated in 5 outbreaks of food poisoning between 1975 and 1986 in the UK , in each of these cases only a small number of individuals were involved, however in each case high numbers ($> 6 \times 10^6$ organisms/ gm) were isolated from the implicated foods in the absence of other recognized foodborne pathogens.

Gilbert et. al. (5) documented 4 instances of food poisoning in which *B. brevis* was the sole organism in high numbers from foods implicated in food poisoning outbreaks.

In any investigation of suspected food poisoning in which none of the normal primary pathogens such as *Salmonella*, *Campylobacter*, *E. coli*, *C. perfringens* and *S. aureus* are isolated *Bacillus* should always be considered as a potential cause. In such studies, particularly if the symptoms exhibited by patients include diarrhoea, species other than *B. cereus* should always be considered.

References:

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