What is *Clostridium perfringens*?

- *C. perfringens* is commonly found in raw meat and poultry. It prefers to grow in conditions with very little or no oxygen, and under ideal conditions can multiply very rapidly. Some strains of *C. perfringens* produce a toxin in the intestine that causes illness.

What are the symptoms of *C. perfringens* food poisoning?

- Persons infected with *C. perfringens* develop diarrhea and abdominal cramps within 6 to 24 hours. Persons infected with *C. perfringens* usually do not have fever or vomiting. The illness is not passed from one person to another.

Who is at risk of *C. perfringens* food poisoning?

- Everyone is susceptible to food poisoning from *C. perfringens*. The very young and elderly are most at risk of a *C. perfringens* infection and can experience more severe symptoms. Complications, including dehydration, may occur in severe cases.

What causes *C. perfringens* food poisoning?

- Although *C. perfringens* may live in the human intestine, illness is caused by eating food contaminated with large numbers of *C. perfringens* bacteria that produce enough toxin in the intestines to cause illness. *C. perfringens* spores can survive...
high temperatures. During cooling and handling of food at temperatures ranging from 12°C to 60°C, the spores germinate and bacteria grow. The bacteria grow very rapidly between 43°C to 47°C. If the food is served without reheating to kill the bacteria, live bacteria may be eaten. The bacteria produce a toxin inside the intestine that causes illness. The toxin needs to be present in a number of 10^3 ufc/g in order to cause a toxin infection.

What are the common food sources of \textit{C. perfringens}?

- Beef, poultry, gravies, and dried or pre-cooked foods are common sources of \textit{C. perfringens} infections. \textit{C. perfringens} infection often occurs when foods are prepared in large quantities and kept warm for a long time before serving. Outbreaks often happen in institutions such as hospitals, school cafeterias, prisons, and nursing homes, or at events with catered food.

How can \textit{C. perfringens} food poisoning be prevented?

- To prevent the growth of \textit{C. perfringens} spores that might be in food after cooking, foods (such as beef, poultry, gravies, and other foods commonly associated with \textit{C. perfringens} infections) should be cooked thoroughly at recommended temperatures, and then kept at a temperature that is either warmer than 60°C or cooler than 5°C. These temperatures prevent the growth of \textit{C. perfringens} spores that might have survived the initial cooking process. Foods that have dangerous bacteria in them may not taste, smell, or look different. Any food that has been left out too long may be dangerous to consume, even if it looks fine.

How can we identify it?

- The most commonly used culture reference methods world-wide for the detection of \textit{Clostridium perfringens} is ISO 7937:2004. This International Standard specifies a horizontal method for the enumeration of \textit{Clostridium perfringens}.

ISO 7937:2004

1. Sowing and incubation

Inoculate sample and subsequent dilutions in empty Petri plates. Pour 15 ml of Cat. 1029 TSC AGAR BASE (ISO 7937) at 45-50 °C. Mix the inoculum and medium and leave to solidify. Add 10 ml of TSC and allow to solidify.

Incubate in anaerobic conditions at 37 °C ± 1 °C, for 18-20h

Count the TSC plates with 15 to 150 cfu. Biochemically confirm black or suspected \textit{C. perfringens} colonies.

2. Biochemical confirmation

Select 3 bacterial colonies of \textit{C. perfringens}, sow in Cat. 1533 THIOGLYCOLLATE USP MEDIUM (ISO 7937)

Incubate in anaerobic conditions at 37 °C ± 1 °C for 18-24

Transfer 5 drops of Thioglycolate to Cat. 1009 Sulphite Lactose Broth using the Durham Tube method and incubate at 46 °C for 18-24 h.

3. Results Interpretation

Presence >1/4 of gas and black color \textit{→ Clostridium perfringens}

BIBLIOGRAFÍA

- International Standard ISO 7937: Microbiology of food and animal feeding stuffs – Horizontal Method for the enumeration of \textit{Clostridium perfringens} – Colony-count technique