Practical Food Microbiology

Lab. 8

Microbial spoilage of canned foods

2021/2022

- *Canning is a method of food preservation involving **heat,** which renders the product shelf stable at ambient storage temperatures; is predominantly dependent on the **pH** of a food.*

- *Spoilage of canned foods occurs due to the action of microorganisms that can survive in the **moist and oxygen- free environment** or by the Spore forming bacteria, e.g., **Clostridium**, **Bacillus** represent the most important group of canned food spoiling microorganisms because of their heat resistant nature (thermophilic nature). In addition, there are other microorganisms, which are not heat resistant (mesophilic) but enter through the leakage of the container during cooling and spoil the food.*

- *In most instances the pack may contain **residual levels of dormant spores** which will not germinate and grow in the product under normal storage conditions. For **low-acid** foods (pH>4.5) these may be **thermoduric spores** of **Bacillus spp. and Clostridium spp.** that will not germinate below **45°C**; and for **semi-acid** and **acid** category foodstuffs (pH<4.5) may be **mesophilic spores** of **Bacillus spp. and Clostridium spp.***

Spoilage of Canned Foods can be divided in to the following

(A) Spoilage of canned meat according to the condition and content of the can:

1- *Swell: include Soft Swell & Hard Swell*

2- *Flipper*

3- *Springer*

4- *Leakage*

5- *Overfilled can*

(B) Spoilage of canned meat according to the cause:

Microbial spoilage: *bacteria, yeasts & moIds ; May result from* ***insufficient processing*** *or* ***leakage****.*

Three types of spore forming bacteria:

1- *Gas producing anaerobes and aerobes with optimum growth temp.* **37ºC**.

2- *Gas producing anaerobes with optimum growth temp.* **55ºC**.

3- *Non-gas producing aerobes or facultative anaerobes with opt. temp.* **55ºC**.

In this experiment you will have an opportunity to become familiar with some of the morphological and physiological characteristics of organisms that cause canned food spoilage, including both aerobic and anaerobic endospore formers of Bacillus and Clostridium, as well as a non-spore-forming bacterium.

Procedure:

1. Open each can carefully with a punch-type can opener. If the can is swollen, hold an inverted plastic funnel over the can during perforation to minimize the effects of any explosive release of contents.

2. Add 1ml of canned food in to a tube containing 9ml of peptone water or nutrient broth.

3. Transfer and streak 0.1ml from the tube on to nutrient agar plate.

4. Incubate the plate at 37ºCfor 24 hours and count the colonies.

5. Repeat the first step and add 1ml of canned food in to another tube containing 9ml of peptone water or nutrient broth.

6. Put the tube in water bath at 80ºCfor 10-15minutes.

7. Incubate the plate at 37ºC for 24 hours and count the colonies (each colony represents only one spore).