**Testing for Bacterial Contamination of Foods**

*Bacteria* are found just about everywhere, and as long as they maintain their personal space and don't get into areas where they do not belong they usually cause no difficulties.

*E. coli* is a type of bacterium that lives only in large intestines. There it causes no harm and actually helps by assisting with waste processing, vitamin K production and food absorption.

When *E. coli* or other types of *microorganisms* leave their normal habitats and establish themselves in an area of the body where they are not normally found, they can cause disease.

Contamination of foods by *E. coli* or other microorganisms can cause illness because the organisms get into our digestive organs and therefore into our blood stream. Once in the blood, they are carried to places they normally would not be found and cause infection.

How can we test for microorganisms such as *E. coli* that might cause contamination of foods? What if we find that the organisms are present in the food - how can we determine the degree of contamination of the food?

The *microbial spoilage* of food depends upon the chemical composition of the food and the types of microorganisms that the food comes into contact with. Freezing, boiling and secure packaging help prevent contamination.

Improper handling, such as employees returning to the food processing area from the bathroom without washing their hands, can cause serious contamination.

Improper beef processing has apparently caused recent outbreaks of a lethal form of *E. coli*. Animal feces (containing *E. coli*) were included in beef processing along with the beef body tissues.

**Part I**

Each member of a two-person team needs to obtain a clean, closed *Petri dish* that contains *nutrient agar*.

Each team needs to select one unknown food solution. Keep the solution closed until it is time to use it.

Observe the location of the Bunsen burner on your lab table. You will use the burner flame to sterilize the opening of your *unknown food solution* container when you open it and before you close it again.

Mark the outer bottom cover of the Petri dish (use tape or grease pencil) with your name.

Petri dishes must be stored upside down in the incubator to prevent moisture from washing away the organisms growing on the surface of the nutrient agar.

Procedure for preparing a growth plate of the unknown food solution (SAMPLE #______):

- Turn the Petri dish right-side-up,
- Open the unknown food solution and *flame* the opening.
• Open the lid of the Petri dish only part way – just enough so that you can pour enough unknown food solution on the agar surface to make a puddle about the size of a dime.

• Close the Petri dish.

• Flame the opening of the unknown food solution container and close the container.

• Take the glass elbow (called an alcohol spreader) from its container of alcohol, tapping as much alcohol as possible off its surface against the inside wall of its container.

• Carefully flame the alcohol spreader and hold it until it cools slightly.

• Open the Petri dish just enough to admit the alcohol spreader.

• Use the sterile alcohol spreader to spread the food solution evenly over the surface of the agar.

• Close the Petri dish.

• Reflake the alcohol spreader, and return it to the alcohol solution.

• Secure the Petri dish with several pieces of tape.

• Place upside-down Petri dish in incubator.

Next session you will look at the growth of colonies on the surface of the plate to see if your food was contaminated.

**PART II**

Observe the sample plates of *Escherichia coli*, *Serratia marcescens* and *Micrococcus luteus*.

Compare the size, shape, height, color and other features of their colonies and record your observations.

Remember! Each colony is a group of many hundreds to thousands of individual organisms.

If these sample plates represented foods being tested, we would continue experimentation by performing a test called a *serial dilution* that isolates the organisms and determines their total numbers in the food solution.