

Food Technology

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What causes food poisoning? What are some harmful microorganisms?

Harmful Microorganisms



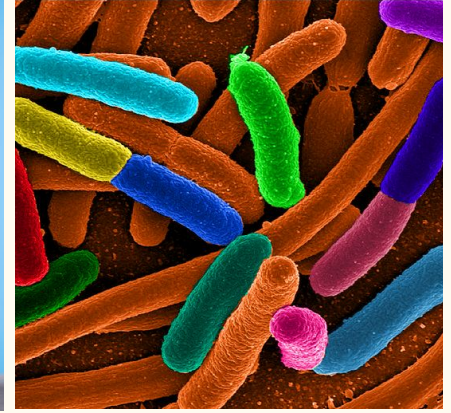
Salmonella

1. Most common harmful microorganism in food
2. Found in eggs, poultry, unpasteurized milk, and certain fruits
3. 1.2 million illnesses and 450 deaths each year
4. Symptoms: Fever diarrhea, vomiting, stomach pain, and nausea



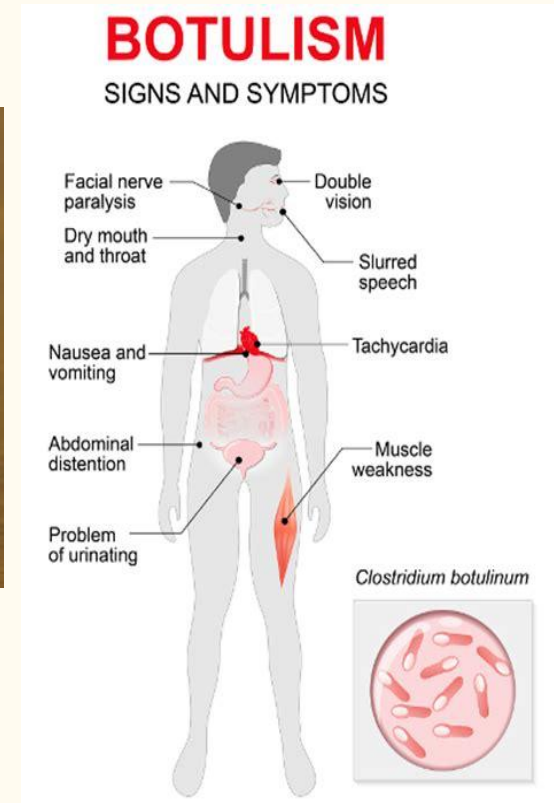
Escherichia coli

1. 96,000 illnesses and 31 deaths each year
2. Found in ground beef, unpasteurized milk and dairy products, fruits, vegetables, and contaminated water
3. Symptoms: Vomiting, stomach pain, severe diarrhea, and kidney failure



Clostridium botulinum

1. Found in improperly canned foods and tainted water
2. Look out for cans with dents and bulges
3. Killing this bacteria alone will not get rid of the toxin that *C. botulinum* releases into the food
4. Symptoms: double vision, muscle weakness, nausea, flaccid paralysis



Helpful Microorganisms

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Lactobacillus

1. Found in yogurt, milk, fermented vegetables, wine, and bread
2. Used to prevent diarrhea, vaginal infections, constipation, and high cholesterol



Saccharomyces cerevisiae

1. AKA “baker’s yeast”
2. Lowers cholesterol, decreases blood glucose, improves immune functions, decreases risk of cancer, and increases nutrient absorption



Natural Microbial Prevention Methods



Keeping the pH Low

1. Increased acidity can be naturally found in foods like fruits, veggies, soy, and spices.
2. Fermentation can also help in maintaining a low pH (i.e. pickling)



Proper Temperature

1. Avoid the “danger zone” which is between 40° and 140°F
2. Properly store foods according to package instructions and cook them thoroughly until they have reached their ideal temperature (this can vary)



Adding Antimicrobials

1. Spices can help add an antimicrobial effect to foods

2. Cinnamon - yeasts

Oregano - fungus called “carvacrol”

Cumin - anti-inflammatory

Garlic - antifungal

Clove - antifungal

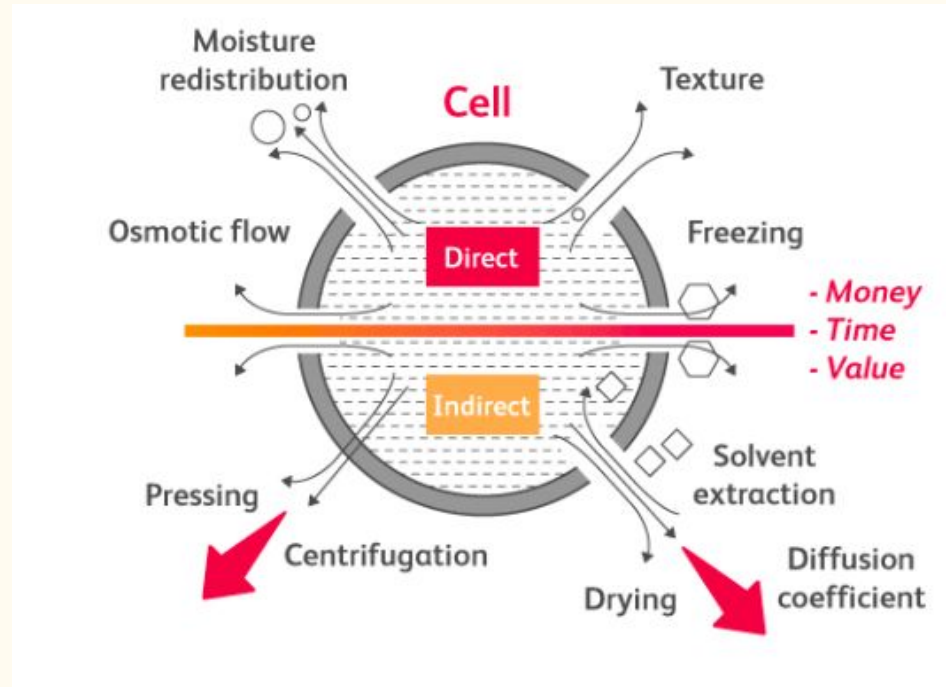


Industrial Food Safety Methods



Pulsed Electric Fields (PEF)

1. Mainly used in liquid foods and drinks
2. Considered “Non-thermal” process
3. Spores and viruses remain unaffected



Oscillating Magnetic Fields (OMF)

1. Uses a plastic bag and a pulsating mechanism with a frequency of about 280 kHz
2. Inhibits the growth of bacteria during the packaging process, extending shelf life

High-pressure Processing (HPP)

1. Applies hydrostatic pressure to destroy microorganisms
2. Ineffective towards the killing of spores
3. Used widely in industrial settings due to its ability to kill a vast majority of microorganisms without compromising nutrient content



Pulsed Light Technology (PLT)

1. Uses a high intensity form of light energy to damage the cell membranes of harmful bacteria
2. Equivalent to about 20,000x the intensity of sunlight
3. Reduces the use of chemicals such as hydrogen peroxide



Globalization of Food Supply



Denmark

1. Successfully eradicated Salmonella poisoning, specifically in poultry
2. Via strict protocols, screenings, and using overall safe preparation methods



New Zealand

1. *Mycoplasma bovis*
2. Planning to eradicate the bacteria through the slaughtering of cows
3. Killing the infected cows will stop the spread of this harmful bacteria



How does this
relate to the Meal
Manager?

Meal Manager

We can prevent food-borne illnesses via microorganisms by....

Washing our hands with soap and water before and after handling food

Washing produce before consuming

Preparing foods safely (i.e. cooking at the right temperature, sanitizing meal prep stations)

Supporting bills having to do with food safety

POP QUIZ!!!

Where does Salmonella come from?

- Poultry, eggs, pasteurized milk, and certain fruits.

POP QUIZ!!!

Name one HELPFUL microorganism and where it can be found.

- Lactobacillus and/or Saccharomyces cerevisia

POP QUIZ!!!

How is New Zealand proposing to get rid of *Mycoplasma bovis*?

- Slaughtering infected cows

POP QUIZ!!!

Name two things you can do to prevent food-borne illnesses.

- Washing our hands before and after handling food
- Washing produce before consuming
- Preparing foods safely (i.e. cooking at the right temperature, sanitizing meal prep stations)
- Supporting bills having to do with food safety

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