



University of Cihan-Sulaymaniyah

College of Medical Science

Department of Medical Microbiology



Food and Industrial Microbiology

Introduction

Lec.1.

Subject: Antibiotics/Spring Semester

Lecturer's name: Dr. Selar Izzat

Ph.D. Biotechnology

2023-2024

The first part of today's lecture

Course Overview

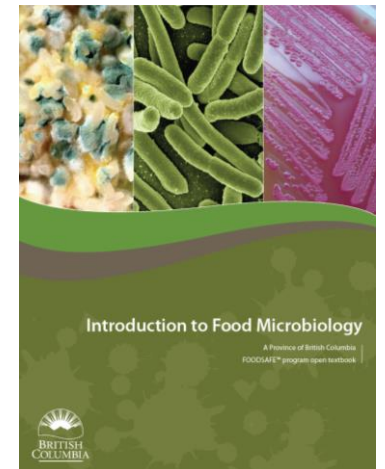
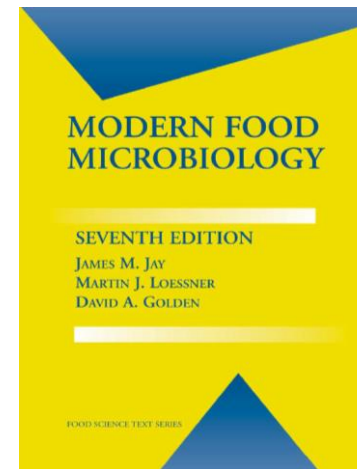
Course Description

- This course will involve studying the basic concepts of food and industrial microbiology, covering types, numbers, and effects of microorganisms in foods, and discussing the ways to control their proliferation and effects in foods.
- Food spoilage and Foodborne microbial disease are discussed with the prevention by hygiene, microbiological standards, and legislation.
- Special emphasis will be placed on major food products, either prepared at home, food factories and restaurants, those that are sold at the markets, or imported outside the country.
- Besides, the exploitation of microorganisms to make industrially valuable products is also included. Especially food fermentation; fermentations of alcoholic beverages, bakery products, dairy products..... Etc.
- Furthermore, particularly in the practical part, microbiological examination of foods, including sample preparation and sampling plans; standard methods for determination of total plate counts, indicator organisms, foodborne pathogenic species, and principal spoilage species are discussed.

The first part of today's lecture

Course Overview

- Textbook
- Required: None. I will be using a variety of sources (books plus journal articles) to generate lectures.
- The following books are supplementary:
- Modern Food Microbiology, Seventh Edition
- Introduction to Food Microbiology, 2020
- Industrial Microbiology: An Introduction



The first part of today's lecture

Course Overview

- Lectures will be available to the students before lectures. Also, any other information relevant to the course will be shared in the classroom.
- Students are required to take notes during the classes.



Exams

- There will be two exams during this semester.
- There is also a comprehensive final exam that will be given at the end of the semester
- The format of the exams might include multiple-choice questions, fill-in-the-blank, concept maps, and short answers.
- There will also be two scheduled quizzes.

The first part of today's lecture

Course Overview



Presentations

- All students will be asked to give a 10-15 minute presentation on a new subjects in the field of Food or industrial microbiology.
- You will need to answer questions concerning your presentation and submit questions about presentations given by other students.



In Class Exercises and Participation

- This class will include discussions. You should participate in the exercises and record the information in your notes.

The Second part of today's lecture

Food Microbiology: An Introduction



- Food microbiology is the study of the specific microorganisms in food (food microbes), and their **beneficial** and **harmful** effects on the quality and safety of raw and processed food.
- Food microbiologists provide us with knowledge and tools to understand the nature and characteristics of food microbes. Food microbes can be beneficial, neutral, or harmful to humans.
- Food microbiology concerns the interactions of m.o. with foods; in particular it involves the control of microbial growth associated with foods.
- Modern-day food microbiology includes not only microbiological aspects of food spoilage and foodborne diseases and their effective control and bioprocessing of foods, but also basic information of microbial ecology, physiology, metabolism, and genetics.

Food microbiology

- These information is helping to:
- To develop methods for rapid and effective detection of spoilage and pathogenic bacteria.
- To develop desirable microbial strains by recombinant DNA technology.
- To produce fermented foods of better quality.
- To develop methods to remove bacteria from food and equipment surfaces.
- To combine several control methods for effective control of spoilage and pathogenic microorganisms in food.

History of m.o. in foods

- Foods, microorganisms, and humans have had a long and interesting association that developed long before the beginning of recorded history.
- Foods are not only of nutritional value to those who consume them but often are ideal culture media for microbial growth.
- Spoilage of prepared foods dates from around 6000 BC.
- The Jews used salt from the Dead Sea in the preservation of various foods.
- The Chinese and Greeks used salted fish in their diet, and the Greeks are credited with passing this practice on to the Romans, whose diet included pickled meats.
- Fermented sausages were prepared and consumed by the ancient Babylonians and the people of ancient China as far back as 1500 BC.
- The Romans excelled in the preservation of meats other than beef by around 1000 BC and are known to have used snow to pack prawns and other perishables.

History of m.o. in foods

- Ergot poisoning (caused by *Claviceps purpurea*, a fungus that grows on rye and other grains) caused many deaths during the Middle Ages.
- Perhaps the first person to suggest the role of microorganisms in spoiling foods was A. Kircher, a monk, who as early as 1658 examined decaying bodies, meat, milk, and other substances and saw what he referred to as "worms" invisible to the naked eye.
- The first person to appreciate and understand the presence and role of microorganisms in food was Pasteur.
- In 1837, he showed that the souring of milk was caused by microorganisms, and in about 1860 he used heat for the first time to destroy undesirable organisms in wine and beer.

