Department of Biology

College of Science

Salahaddin University/Erbil

Subject: Food Microbiology

Course Book – (Year 4)

Lecturer's name: Dana Faiq Hoshiyar (M.Sc.)

: Abdulilah S. Ismaeil (Ph.D.)

Academic Year: 2022/2023

Course Book

1. Course name	**Food Microbiology (Theory)**
2. Lecturer in charge	**Dana Faiq Hoshiyar Mustafa**
3. Department/ College	**Biology/Science**
4. Contact	**e-mail: dana.mustafa@su.edu.krd** **Tel: 07504520237**
5. Time (in hours) per week	**Theory: 2** **Practical: 2**
6. Office hours	**2 hrs. / week (twice = 4hrs.)**
7. Course code	**SBIO 403**
8. Teacher's academic profile	**Education** **1-Baccalaureate, Baghdad College/Baghdad (Secondary school), 1971 .** **2-B.Sc. degree in Food Science, 1975/ College of Agriculture/University of Baghdad** **3-M.Sc. Degree in Food Science(Food Microbiology), 1978 /College of Agriculture/ University of Baghdad.** **Scientific Posts** **1-Assistant lecturer from 30/ 4/ 1980 .** **2- Lecturer from 2/ 11/ 1984 .** **3- Assistant Professor from 9/ 12/ 1989 .** **Places of Posts :-** **1- Department of food science ,College of**

	Agriculture , University of Sulaimanyaia from **30/4/1980 to 31/8/1981.** **2- Department of food science ,College of Agriculture , University of Salahaddin from** **1/9/1981 to 31/8/1987.** **3- Department of Biology ,College of Science, University of Salahaddin from** **1/9/1987 up to date**
9. Keywords	**Food microbiology, Food preservation, Food spoilage, Food poisoning.**

10. Course overview:

Food Microbiology (First Semester)

Course Overview

The course introduces the basic concepts of food microbiology.

Food Microbiology include an overview of groups of microorganisms important in food (bacteria, moulds, yeasts) with factors effecting on their growth in food.

Also the course includes the sources of food contamination with microorganisms, spoilage of food products by microorganisms, methods of food preservation.

Also includes the important food pathogens and methods of prevention and controlling them.

Also the course includes the microbiological quality and safety of foods.

11. Course Objectives (Food Microbiology)

*** Understand What factors influence microbial growth in foods.**

*** Understand the causes of food spoilage and predict the microorganism that can spoil a given food, when prepared, processed and stored under given conditions.**

*** What methods and principles can be used for controlling microbial contamination and for preventing subsequent growth of undesirable microorganisms in raw and processed foods.**

*** Understand the causes of food borne microbial diseases and predict the pathogens that can grow in a given food, when prepared, processed and stored under given conditions.**

*** Be able to predict the necessary measures to control the spoilage and pathogenic microorganisms in food.**

***What procedures can be used for reducing health hazards associated with foods and for extending the shelf-life of foods?**

*** Be able to identify the microbiological criteria.**

12. Student's obligation

1. The student should attend the class regularly, participation is important for Understanding the lecture.

2. Absences are allowed only for necessary excuse and according to the Instructions of absences.

3.The student should take 1-2 exams through the semester and a final exam(2attempts).there will be no makeup exams for absences students without a reasonable excuse and must be With documents.

4. Talking is not allowed during the lecture.

5. Questions & distinguishing by the students are preferred.

13. Forms of teaching

Course book and power point & white board.

14. Assessment scheme

1. Theoretical exam = 65% practical exam = 35%

2. Theoretical exam = 15% for the semester exam and 50% for the final Exam.

3.Practical exam = 35% for the semester exam

15. Student learning outcome:

1. learn and understand the interrelationship of microorganisms with Foods and their role in food spoilage & food poisoning.

2. Learn & understand the different methods of food preservations.

3. Predict the impact of food production and food handling.

4. Discuss the detection and enumeration of microorganisms in foods Including the spoilage & food poisoning microorganisms.

5. Identify the indicator microorganisms and microbiological criteria.

6. Identify the important pathogens and spoilage microorganisms in foods and understand the role of environmental factors (i.e. aw, pH, temperature, oxidation-reduction potential) on the growth and Response of microorganisms.

16. Course Reading List and References:

Food Microbiology

Course Reading List

1- Garbutt, John, 2000. Essentials of food microbiology. Arnold(London, Sydney, Auckland)

2- Adams, M.R. and Moss M.,O. 2008. Food Microbiology, 3 rd Ed. RSC publishing.

3- Jay, J. M., M. J. Loessner, and D. A. Golden. 2005. Modern food microbiology, 7th ed.Springer, New York, NY.

4- Ray, B., Buhnia, Arun. 2008. Fundamental food microbiology, 4rd Ed. CRC Press, Boca Ratan, FL.

5- e-book sites (http://gigapedia.com , http.//www.scribd.com)

6- Journals of particular interest to Food Microbiology :-

Journal of Applied and Environmental Microbiology; Journal of Applied Microbiology, Journal of Dairy Science, Journal of Food Protection, Journa of Food Safety, Journal of Food Science, International Journal of Food Microbiology.

17. The Topics:	**Lecturer's name**

Food Microbiology Course programmed (weekly) **(First semester)** **1. An Introduction of the groups of microorganisms important in food with the factors effecting on growth of microorganisms in food.** **2. Sources of food contamination and methods of controlling them.** **What determines the composition of the spoilage microflora.** **3. General basis of food preservation.** **4. Food preservation by Low Temperature (cooling, freezing) and their effects on microorganisms.** **5. Food preservation by using High temperature (Pasteurization, sterilization) and their effects on microorganisms.** **6. Food preservation by drying, preservatives and radiation and their effects on microorganisms.** **7. Microbial food spoilage & the factors affect food spoilage by microorganisms.** **8. Microbial spoilage of milk and milk products.** **9. Microbial spoilage of cereal products** **10. Microbial spoilage of fruits and vegetables.** **11. Microbial spoilage of sugar and sugar products (juices, honey , beverages , etc……..)** **12. Microbial spoilage of meat , poultry and fish .** **13. Microbial spoilage of egg and canned foods .** **14. Food borne pathogens.** **15. Microbiological criteria .**	**Dana Faiq Hoshiyar (2 hrs) (Thoery)**
18. Practical Topics (If there is any)	

Food Microbiology **Week 1** **An introduction of food microbiology** **In this lab.** **1-Description the microorganisms which have negative relationship with foods.** **2-Describe the differences between food poisoning & food spoilage.** **Week 2** **Methods for microbial examination of food** **1- Direct microscopic count (DMC).** **Week 3** **2- Total colony count** **a. pour plate method** **b. spread plate count** **Week 4** **3- Most probable number (MPN)** **Week 5** **Dye reduction test (Raw milk test).**	**Abdulilah S. Ismaeil** **Ph.D. in Food Microbiology** **(Practical)** **(2hrs.)**

Week 6 **Laboratory pasteurization count method (LPC).** **Week 7** **Food preservation by high temperature** **Week 8** **Food preservation by preservative.** **Week 9** **Meat and meat product spoilage .** **Week 10** **Cereal and cereal product spoilage** **Week 11** **Spoilage of vegetables and fruits.** **Week 12** **Isolation of *Staphylococcus aureus* from foodsamples.** **Week 13** **Isolation of Bacillus cereus from food samples.** **Week 14** **Isolation of E. coli from food samples.** **Week 15**	

Isolation of Clostridium perfrengens from food samples.	

19. Examinations:

Sample of a final examination

Q.1) Through a graph or sketch show the followings :- (Answer only two) (16 marks)

1- How a pH approaching the minimum influences the growth curve of an organism .
2- Interactions involved in the selection of spoilage microflora .
3- The growth of bacterial spoilage and its relationship to the spoilage symptoms.

Q.2) Define the followings :- (Answer only four) (12 marks)

Thermal Death Time - Mycotoxins - Food infection - Microbiological Standards - F value -

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Q.3) Give the main effects of the followings on microorganisms :(Answe:- (Answer only two) r only two) (12 marks)

1- Preservatives 2- Slow freezing 3 – Drying

Q.4) Give reasons for the followings with examples :- (Answer only seven) (21 marks)

1-Acid curdling in raw milk 2-Flat sour in acid canned foods
3-Organic acid fermentations in juices 4-Sour bread
5- Black rot in egg 6-Rancidity of fish

7-Sulfide stinker Spoilage in canned foods 8-Surface film in pickles
9-Bitternes in cheese 10-Soft rot in fruits and vegetables.

Q.5) Give brief notes for the followings :- (15 marks)

1- Effect of water activity as a factor effecting on heat resistance of microorganisms .
2- The growth of microorganisms in relation to redoxpotential and the redox of foods.
3- Effect of age of microorganisms as a factor effecting the destruction of microorganisms
by radiation .

Q.6) (14marks)
1- Only enumerate the sources of fish contamination.
2-For Botulism give the followings:-
Causative agent – The symptoms - Foods involved

20. Extra notes:

21. Peer review
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