

Syllabus for Certificate Course

FOOD SAFETY AND MICROBIOLOGY

Paper No.	Title of the paper	Marks allotted
		Theory
I	Fermentation technology	25
II	Social responsibilities	25
	Total	50

ANDHRA CHRISTIAN COLLEGE : GUNTUR

DEPARTMENT OF PG ZOOLOGY

TITLE OF THE PAPER: FOOD SAFETY AND MICROBIOLOGY

NO OF HOURS: 30

CREDITS: 02

Course Objective:

- • To emphasize on the importance of food safety, food quality and food laws and regulations
- • Enables the students in application of basic aspects of public health and food safety and quality surveillance system

Course Outcomes:

CO1: To familiarize students to apply protocol for safe food handling techniques, water and waste management

CO2: To understand the role of food packaging and the importance of Nutrition labeling.

CO3: To analyse consequences of food poisoning and infection on the health of individuals

CO4: To Understand the basic principles food preservation methods

UNIT-I FOOD HANDLING AND PUBLIC HEALTH

(7Hrs)

FOOD HYGIENE – Introduction, Definition, Basic aspects of Personal Hygiene, Disease transmission

FOOD HANDLING -preventing food borne illnesses, Education of food handler in handling and serving food, Importance of personal hygiene of the food handler, pest control

WATER TREATMENT- Sources, Principles of water purification, disposal of water.

WASTE DISPOSAL – Types of wastes, Solid wastes, liquid wastes, gaseous wastes and disposal.

II Explain the Importance of the gram stain
In microbiology?

- A. → Gram's stain plays a vital role in microbiology
- It is a differential staining technique
 - type in which we use two set of stains
 - It was developed by Sir Hans Christian Gram in 1884 so to honour him the name of the staining technique is given as Gram's staining.
 - By this staining technique we can identify the Gram positive and Gram negative Bacteria Based on the chemical and physical properties of their cell walls.
 - In this staining technique we use 2 set of stains used in successive

with a step of de colourisation in between
→ if the bacteria takes first stain/primary stain they are called Gram positive
→ if the bacteria take second stain they are called Gram negative.

Apparatus and reagents :-

Personal protective equipment, microscopic glass slides, slide rack, dropper, timer, absorbent paper, water, crystal violet, Gram's iodine, De colorizer, Safranin, Bright field microscope with 100x objective, Immersion oil, Pencil.

Procedure :-

1. Primary staining :- Cover the smear with 0.5% methyl violet solution and allow it to act for 30 seconds
wash it with water

2. Mordanting:- covers the smear with Gram's iodine. Allow it to act for 1 minute. Wash with water.

3. Decolorization:- Decolorize the smear by pouring absolute alcohol drop by drop till no more stain comes off. Wash with water.

4. Counterstaining:- covers the smear with 0.5% Safranin. Allow it to act for 1 minute. Wash with water.
→ Dry between the folds of filter paper.

→ Observe under oil immersion objective

Result :- (i) Gram positive cells take violet colour

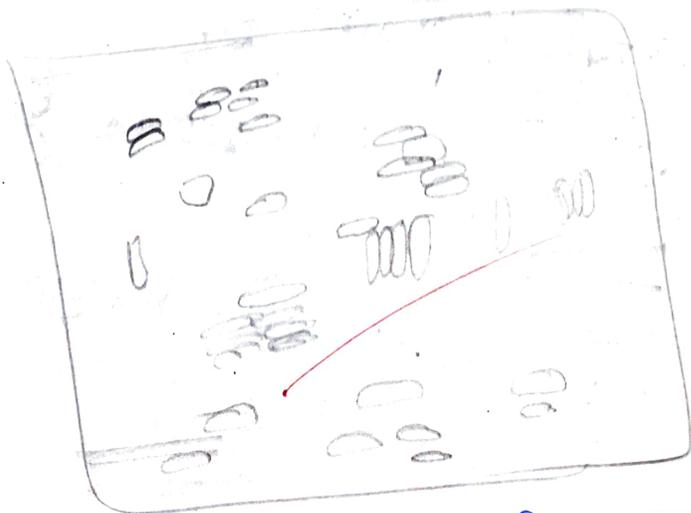
2. Gram negative cells are stained pink.

Composition of stains :-

1. Methyl violet :- methyl violet powder 5g
Distilled water 1000 cc

2. Grams iodine :- Iodine crystals 10g
Potassium Iodide 20g
Distilled water 1000ml.

3. Safranin :- Safranin 5g
Distilled water 1000ml.



Gram positive cocci and Gram negative bacilli

Write 20 Lines
Flowchart of Gram's Staining

Prepare a smear of Bacterial cultures



Stain with Crystal Violet for 30 sec



Rinse in distilled water for 2 sec



Grams Iodine for 1 min



Rinse in distilled water



wash in 95% ethanol or acetone for 10-30 sec



Rinse in distilled water



add Safranin for 30-60 sec



Rinse in distilled water & blot



Observe under microscope

Scheme of Evaluation (External)
Answer the following

~~1~~
22
25

Marks: 25 x 1=25

1

1. Which of the following is a foodborne illness caused by bacteria?

- a) Influenza
- b) Salmonella
- c) Malaria
- d) Allergic reaction

[b]

2. What is the recommended minimum internal cooking temperature for poultry?

- a) 120°F (49°C)
- b) 140°F (60°C)
- c) 165°F (74°C)
- d) 180°F (82°C)

[c]

3. Which of the following is NOT a potential food safety hazard?

- a) Cross-contamination
- b) Temperature abuse
- c) Proper handwashing
- d) Food allergens

[c]

4. What is the temperature danger zone for food?

- a) 32°F to 40°F (0°C to 4°C)
- b) 41°F to 50°F (5°C to 10°C)
- c) 51°F to 60°F (11°C to 16°C)
- d) 41°F to 135°F (5°C to 57°C)

[d]

5. What is the proper way to thaw frozen meat?

- a) Leave it on the kitchen counter overnight
- b) Thaw it in hot water
- c) Thaw it in the refrigerator
- d) Cook it directly from frozen

[c]

6. Which of the following is an example of a physical food hazard?

- a) Bacteria
- b) Mold
- c) Broken glass
- d) Chemical residues

[c]

7. What is the recommended method for extinguishing a grease fire in the kitchen?

- a) Pour water on it
- b) Smother it with a wet cloth
- c) Use a fire extinguisher
- d) Blow on it

[c]

8. How often should food handlers wash their hands?

- a) Only after using the restroom
- b) Before and after handling raw food
- c) Once a day
- d) Only when visibly dirty

[b]

9. What is the maximum amount of time that perishable food should be left at room temperature?

- a) 2 hours
- b) 4 hours
- c) 6 hours
- d) 8 hours

[b]

10. What is the primary cause of food spoilage?

- a) Cross-contamination
- b) Insufficient cooking
- c) Time and temperature abuse
- d) Improper storage

[c]

11. Which government agency is responsible for setting and enforcing food safety regulations in the United States?

- a) FDA (Food and Drug Administration)
- b) USDA (United States Department of Agriculture)
- c) CDC (Centers for Disease Control and Prevention)
- d) WHO (World Health Organization)

[a]

12. What is the proper way to handle and store raw meat to prevent cross-contamination?

- a) Keep it in the same container as ready-to-eat food
- b) Store it above cooked foods in the refrigerator
- c) Use separate cutting boards and utensils for raw meat
- d) Rinse it with water before cooking

[c]

13. Which of the following is an example of a chemical food hazard?

- a) Salmonella
- b) Listeria
- c) Pesticide residue
- d) Mold spores

[c]

14. What is the proper way to cool cooked food for storage?

- a) Leave it at room temperature until it cools down
- b) Refrigerate it immediately
- c) Place it in a covered container and then refrigerate
- d) Freeze it as soon as possible

[c]

15. Which food safety principle emphasizes keeping food out of the temperature danger zone as much as possible?

- a) Proper handwashing
- b) Cross-contamination prevention
- c) Time and temperature control
- d) Personal hygiene practices

[c]

16. What is the recommended minimum internal cooking temperature for ground beef?

- a) 120°F (49°C)
- b) 140°F (60°C)
- c) 165°F (74°C)
- d) 180°F (82°C)

[c]

17. What is the proper way to store leftovers in the refrigerator?

- a) Leave them uncovered to cool down faster
- b) Store them in shallow containers
- c) Mix hot and cold food together in one container
- d) Keep them at room temperature for a few hours before refrigerating

[b]

18. Which of the following is an example of a biological food hazard?

- a) Broken glass
- b) Chemical residues
- c) Allergens
- d) E. coli bacteria

[a]

19. What is the proper temperature for refrigerator storage?

- a) 32°F (0°C)
- b) 41°F (5°C)
- c) 50°F (10°C)
- d) 60°F (16°C)

[b]

20. How often should food establishments sanitize food contact surfaces?

- a) Once a day
- b) Once a week
- c) After each use
- d) Only when visibly dirty

[c]

21. Which of the following structures contains genes for enzymes and antibiotic resistance?

- a) Plasmid

[a]

- b) Pilus
- c) Capsule
- d) Plasma membrane

22. Which of the following is the most important structure related to microbial attachment to cells?

- a) Flagellum
- b) Plasmid
- c) Peptidoglycan
- d) Glycocalyx

[d]

23. Which of the following is not a gram-negative bug?

- a) *Clostridium perfringens*
- b) *Vibrio cholerae*
- c) *Escherichia coli*
- d) *Bordetella pertussis*

[b]

24. Which of the following is not true related to endotoxins?

- a) Endotoxins are secreted from cells.
- b) Can be linked to Meningococemia
- c) Produced by gram negative microorganisms
- d) Can cause fever

[a]

25. Which of the following microorganisms stain well?

- a) *Escherichia coli*
- b) *Legionella pneumophila*

[a]

c) *Treponema*

d) *Chlamydia*

II. Explain the importance of the gram stain in microbiology

10M

SCHEME OF EVALUATION (INTERNAL)

Visit to microbiology lab and field notes

(10 + 5 = 15)

Grand total (External=35 + Internal=15 ---50M)