



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DIPLOMA IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2009

TITLE OF PAPER : INTRODUCTION TO FOOD MICROBIOLOGY
COURSE CODE : EHS 312
DURATION : 2 HOURS
MARKS : 100

INSTRUCTIONS : ANSWER **ONLY FOUR** QUESTIONS
: QUESTION **ONE IS COMPULSORY**
: EACH QUESTION CARRIES 25 MARKS.
: WRITE NEATLY
: BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

Question 1

Multiple Choice Questions

(Choose the most appropriate answer)

1. Assume that a culture of pathogenic bacteria was in a favorable food medium. Assume further that the food medium was ingested. Foodborne disease would be less likely if the culture were in the;
 - A. logarithmic phase
 - B. accelerated death phase
 - C. lag phase
 - D. stationary phase
 - E. all of the above

2. Which statement is (are) **not true** in relation to aspergillus spp. mold
 - A. all species are Xerophilic and thermophilic
 - B. produce high amount of amylase and proteolytic enzymes
 - C. will grow in high concentration of sugar and salt
 - D. will grow on refrigerated and chilled meat exhibiting graying brown growths
 - E. Both B and D

3. Which statement is (are) true in relation to Penicillium spp. mold
 - A. will cause white patches in refrigerated and chilled meat
 - B. will show greenish patches on frozen and chilled meat
 - C. will cause grayish brown growths on refrigerated and frozen meat
 - D. grow and build up on equipment, therefore known as "machinery mold"
 - E. Both A and D

4. Refrigerated and chilled meat will develop----- moldy growth when spoiled by Sporotrichum carnis;
 - A. white patches in refrigerated and chilled meat
 - B. greenish patches on frozen and chilled meat
 - C. grayish brown growths on refrigerated and frozen meat
 - D. black patches on frozen and chilled meat
 - E. None of the above

5. Mold growths are observed on honey and the most likely cause would be;
 - A. Aspergillus species
 - B. Thamnidium species
 - C. Geotrichum candidum
 - D. Sporotrichum carnis
 - E. Alternaria brassicae

6. Two persons developed a food borne illness after the consumption of a biltong (salted dried meat), which among the microbes below would you suspect to have caused the sickness?
 - A. Clostridium perfringens
 - B. Vibrio parahaemolyticus
 - C. Staphylococcus aureus
 - D. Bacillus cereus
 - E. Salmonella typhi

7. Foods containing food borne disease bacteria are;
 - A. not necessarily decomposed in appearance
 - B. detectable by smell
 - C. detectable by taste
 - D. detectable by smell, taste and appearance
 - E. detectable by slight color change

8. The most effective measure which a food service manager can apply in the control of bacterial multiplication in the storage, preparation and service of food is;
 - A. time- temperature control
 - B. pH control
 - C. inventory control
 - D. dishwashing control
 - E. moisture control

9. Assume you prepared several batches of the same type salad under the same conditions, except that you added varying amounts of mayonnaise. In salads with high mayonnaise content, you would expect;
 - A. a higher pH and a lower bacteria count
 - B. a lower pH and a lower bacteria count
 - C. a higher pH and a higher bacteria count
 - D. a lower pH and a higher bacteria count
 - E. a neutral pH and a lower bacteria count

10. Under normal, comparable circumstances, which of the following would be expected to have the highest bacterial counts per gram?
 - A. Hamburger
 - B. Round steak
 - C. Sirloin steak
 - D. T-bone steak
 - E. All of the above

11. Which of the following symptoms is not generally included in those of chemical food poisoning?
 - A. nausea
 - B. fever
 - C. abdominal pain
 - D. vomiting
 - E. the body is weak

12. Bacteria are not likely to grow and multiply in Coca Cola soft drinks because of:
 - A. the low temperature during storage
 - B. the high concentration of sugar
 - C. the high concentration of caffeine
 - D. the low pH
 - E. the high pH

13. Clostridium perfringens food borne illness is transported by which of the following vehicles?
 - A. potato salad
 - B. meats served several hours or a day or so after cooking
 - C. raw vegetables
 - D. cooked vegetables
 - E. all of the above

14. Which of the following statement is not correct in reference to *Yersinia enterocolitica*?
 - A. Swine has been found to be a major source of human pathogenic strain
 - B. produce greater amount of toxin at low temperatures
 - C. produce illness that resembles that of Escherichia coli
 - D. temperature for growth ranges from -2 to 45 deg C , but optimum at 22-29 deg C
 - E. it has been isolated with high frequency in poultry (poultry is major source)

15. Which of the statement is not correct in reference to *Campylobacter jejuni*?
 - A. temperature for growth ranges from 25 -45 deg C but optimum at 42-43 deg C
 - B. it is sensitive to freezing temperatures
 - C. it is catalase and oxidase positive but can not ferment carbohydrates
 - D. poultry has been found to be the major source
 - E. its diarrheal symptoms show watery stools that are foul smelling, fresh blood and mucus may be seen.

16. Which of the statement is correct in reference to *Clostridium perfringens*?
- A. produce toxins in the stomach and intestines of victims during Sporulation
 - B. produce toxins in the food during growth
 - C. it is aero tolerant, and does not necessarily require stringent anaerobic condition for growth
 - D. it strictly anaerobic and will not grow in the presence of oxygen
 - E. Both A and C
17. A rancid flavor in dairy products may be associated with one of the following mold species;
- A. Geotrichum candidum
 - B. Cladosporium herbarum
 - C. Alternaria citri
 - D. Botrytis cinerea
 - E. None of the above
18. Which of the following foods would be more suspect as the vehicle for botulism?
- A. Rare beef
 - B. Rare pork
 - C. Honey
 - D. Home canned grapefruits
 - E. Home canned green beans
19. An outbreak characterized by nausea, and or vomiting plus diarrhea which appears two to six hours after ingestion of potato salad would lead you to suspect;
- A. Shigellosis
 - B. Botulism
 - C. Staphylococcal intoxication
 - D. Salmonellosis
 - E. None of the above
20. Staphylococcal intoxication is caused by;
- A. ingestion of spoiled food
 - B. ingestion of preformed toxins
 - C. toxins formed after ingestion
 - D. ingestion of staphylococcal microbes
 - E. All of the above

21. Avidin and lysozyme are intrinsic antimicrobial substances that are found in:
- A. garlic
 - B. eggs
 - C. cheese
 - D. tomatoes
 - E. none of the above
22. What is the primary factor in the preservation of fermented foods?
- A. acidity
 - B. alkalinity
 - C. chemical preservation
 - D. heat
 - E. water activity
23. Factors inherent in a food that can influence microbial growth are known as:
- A. processing factors
 - B. nutritional factors
 - C. intrinsic factors
 - D. extrinsic factors
 - E. biochemical factors
24. The types of bacteria that are most likely to survive pasteurization are the:
- A. spore-formers
 - B. thermotolerants
 - C. mycotoxins
 - D. molds
 - E. A and B above
25. In which of the following would you expect to find the optimum growth of *Clostridium botulinum*?
- A. beef stew
 - B. meat burger
 - C. canned pineapples
 - D. canned tomatoes

[25 Marks]

Question 2

- a. What is botulinum cook and why is it important in food? [3]
 - b. Which type of food is to be given a botulinum cook and why? [3]
 - c. How would you control botulism in food? [4]
 - d. What symptoms are indicative of botulism? [5]
 - e. Explain the differences in bacterial toxins and mycotoxins? [4]
 - f. You are not likely to find bacteria and molds growing or spoiling the same type of food; why is that so? [6]
- [25 Marks]**

Question 3

- a) Environmental factors such as oxygen and temperature will influence the population of microorganisms on and/or in food. Using appropriate examples explain this statement. [15]
 - b) Food borne illnesses outbreaks associated with excreta borne infections are a major concern in Swaziland. Why is that so? Good examples will enhance your answer. [10]
- [25Marks]**

Question 4

Using appropriate examples discuss food spoilage under the following headings

- a) Microbial [10]
- b) Enzymatic [8]
- c) Chemical [7]

[25 Marks]

Question 5

In the quest to prevent foodborne infections, the World Health Organization (WHO) has identified five keys to safer food. Identify and discuss these keys and show how they control foodborne infections.

[25 Marks]