



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DEGREE IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2018

TITLE OF PAPER : FOOD PRESERVATION

COURSE CODE : EHS 447

DURATION : 2 HOURS

MARKS : 100

- INSTRUCTIONS** :
- : ANSWER ONLY FOUR QUESTIONS
 - : QUESTION ONE IS COMPULSORY
 - : EACH QUESTION CARRIES 25 MARKS.
 - : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
 - : NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
 - : 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 Best Answer)

1. In meat stored in cold temperature, which group of spoilage organisms is susceptible to injury at temperatures below 3.3deg C?
 - A. gram positive cocci
 - B. gram negative rods
 - C. gram positive rods
 - D. bacterial spores
 - E. psychrophiles

2. Which form of sulfur dioxide is more active against microorganisms?
 - A. bisulfate ions
 - B. sulfite ions
 - C. undissociated sulfur dioxide
 - D. any undissociated form
 - E. all forms are equally effective

3. Which type of microorganism is most resistant to UV irradiation?
 - A. bacterial spores
 - B. gram-positive cocci in chains
 - C. gram-positive cocci in clusters
 - D. gram-negative non-sporing rods
 - E. mold spores

4. Treatments such as drying or freezing affect bacteria in foods in which of the following ways?
 - A. kill all of them
 - B. have no effect on their viability
 - C. kill and injure some of them
 - D. resuscitate them
 - E. make them more resistant to chemicals

5. Benzoic acid cannot be relied on to preserve foods capable of supporting bacterial growth because?
 - A. It can inhibit most yeast and molds
 - B. It is an antimycotic agent
 - C. Many spoilage bacteria are much more resistant to it
 - D. Food poisoning and spore-forming bacteria are generally inhibited by 0.01-0.02 % undissociated acid
 - E. Both A and B

6. Which part of a microbial cell is the most susceptible to decomposition by UV irradiation?
- A. amino acids
 - B. lipids
 - C. nucleic acids
 - D. the cell wall
 - E. water molecules
7. Bakeries have found UV helpful in controlling microorganisms;
- A. in interiors of cream-filled pies
 - B. in flour that is stained by rodent urine
 - C. in air to prevent spread of viable microorganisms to surface of bread
 - D. in jam and jelly fillings
 - E. in dough to accelerate fermentation
8. Assume you prepared several batches of the same type of the salad under the same conditions, except that you added varying amounts of vinegar. In the salads with high vinegar 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 no change in bacteria count
9. Factors inherent in a food that can influence microbial growth are known as:
- A. extrinsic factors
 - B. intrinsic factors
 - C. nutritional factors
 - D. physicochemical factors
 - E. processing factors
10. The direct or indirect transmission of objectionable matter to a food product is called by which of these names?
- A. adulteration
 - B. contamination
 - C. infection
 - D. infestation
 - E. pollution
11. Which of these microorganisms are sensitive to freezing temperatures?
- A. *Clostridium botulinum* type E
 - B. Spores and toxins
 - C. *Clostridium perfringens* and *Bacillus subtilis*
 - D. *Listeria monocytogenes* and *Yersinia enterocolitica*
 - E. *Cladosporium herbarum*

12. Which of the following statements is **not correct** in relation to freezing temperatures?
- A. *Pseudomonas*, and *Alcaligenes* species will grow
 - B. *Penicillium* and *Thamnidium* species grow in frozen meat
 - C. Parasitic protozoa and *Cysticercus bovis* are destroyed
 - D. Rod shaped bacteria are more resistant than cocci shaped bacteria
 - E. The growth of psychrophiles in meat results in color defects.
13. Bacterial contaminants;
- A. Multiply rapidly in dehydrated foods
 - B. Resume multiplication when dried foods are reconstituted.
 - C. Do not grow well in reconstituted dehydrated foods.
 - D. Are eliminated in foods during the dehydration process.
 - E. Are not found in dehydrated foods
14. In meat sausages sodium nitrate and sodium chloride are added to;
- A. prevent the germination of *Clostridium botulinum* spores
 - B. destroy viable *Clostridium botulinum* spores
 - C. destroy *Clostridium botulinum* cells
 - D. destroy all viable spores in the sausage except *Clostridium botulinum*
 - E. inactivate neurotoxins in the sausage
15. Once a can containing food has been opened and partially used.
- A. the remaining food should be discarded after 6 hours
 - B. the remaining food becomes poisoned if left in the can
 - C. the remaining food should be covered and refrigerated in the can
 - D. the remaining food should not be eaten unless boiled for 30 minutes
 - E. the remaining food can be eaten since the can is sterile and it was canned under hygienic conditions
16. If beef is prepared from the semi tropics climate (warm), and another beef from cooler climate areas are stored in a chiller? Which beef would store longer in the chiller before spoilage?
- A. Beef from the semi tropics
 - B. Beef from cooler climate
 - C. Equal storage duration
 - D. Depends on the number of microbes
 - E. Depends on the phase of the bacteria

17. Which of these foods has the lowest water activity (A_w)
- A. Chocolate
 - A. Breakfast cereals
 - B. Raisins
 - C. Flour
 - D. Sweetened condensed milk
18. Reports of foodborne disease indicate that the implicated food was usually;
- A. a canned food
 - B. a food held for long periods at room temperatures.
 - C. an improperly cooked food
 - D. a food stored too long in the refrigerator
 - E. food that has been handled by a sick food handler
19. Which of the following is not consistent with present knowledge of bacterial survival in frozen food?
- A. it is possible for food poisoning to occur from ingestion of a frozen product containing Staphylococcal toxins
 - B. pathogenic bacteria may survive freezing, but freezing destroys their ability to multiply
 - C. survival is affected by the speed and temperature of freezing
 - D. some multiplication of bacteria may occur in bulky batches during the freezing process.
 - E. in minced beef, salmonellae survived the freezing storage
20. Reduction of water content in liquid foods without conversion to a dry state is known as:
- A. concentration
 - B. condensation
 - C. evaporation
 - D. extraction
 - E. sublimation
21. Parabens of long carbon chains are not used as preservatives in food because;
- A. they have poor solubility
 - B. they dissipates very quickly in food
 - C. they have poor antimicrobial activity
 - D. they are more effective on gram positive than gram negative
 - E. they more effective on molds than yeasts
22. Parabens are man-made chemical preservatives that are use in;
- A. food
 - B. cosmetics
 - C. pharmaceuticals
 - D. beverages
 - E. in all of the above

23. Propionic acid is added in bakery products to;
- A. kill both gram positive and gram negative bacteria
 - B. kill both yeast and molds
 - C. inhibit both gram negative and gram positive bacteria
 - D. inhibit both molds and gram positive bacteria
 - E. inhibit all microbes
24. Sulphur dioxide in food may results in the;
- A. destruction of thiamin
 - B. formation of nitrosamines
 - C. colon cancer
 - D. worsening of asthma condition
25. Sulphur dioxide is added in wine to prevent;
- A. mold growth
 - B. bacterial growth
 - C. yeasts growth
 - D. rancidity
 - E. enzymatic and non-enzymatic browning

[25 Marks]

Question 2

- a) Write short notes on food preservation for the following methods ;
- i) Microwave oven [6]
 - ii) Gamma rays [8]
- b) Using relevant examples, explain how the following factors influence the effectiveness of a chemical preservative in food?
- i) pH [4]
 - ii) shape of the microbe [3]
- c) Benzoic acid is added in food to combat acid tolerant fungi. Name two yeasts that may grow in soft drinks in the presence of benzoic acid. [4]

[25 Marks]

Question 3

- a) In what type of food would you add sodium nitrate and why? [5]
- b) Show the relationship between pKa and the preservation of foods by organic acids.[5]
- c) Explain the health risk in the process of canning vegetables for the following processes.
- Exhaustion [3]
 - Sterilization [5]
 - Cooling [3]
- d) How does smoking preserve fish? [4]

[25 Marks]

Question 4

- a) In the use or choice of a chemical preservative in food, what factors should be considered and why? [8]
 - b) Show the benefits and limitations of pasteurization and sterilization in the preservation of food. [9]
 - c) Explain the shortcomings on the use of nitrate as a preservative. [4]
 - d) The benefits on the use of nitrate as preservative outweighs the disadvantages. Why is that so? [4]
- [25 marks]**

Question 5

- a) Discuss the effects of freezing temperature on microorganisms. Support your answer with good examples. [10]
 - b) How can you reduce or prevent the spoilage of food in the freezer? [5]
 - c) What do you understand by the Perigo factor (PF) in meat preservation using nitrate? [5]
 - d) It is prohibited to add Sulphur dioxide in meat products. Why? [3]
 - e) Which two bacteria are likely to cause ropey bread? [2]
- [25 Marks]**