



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences



DIPLOMA IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2008

TITLE OF PAPER : **FOOD SAFETY & PRESERVATION**

COURSE CODE : **EHS 313**

DURATION : **2 HOURS**

MARKS : **100**

INSTRUCTIONS : **ANSWER ANY FOUR QUESTIONS**

: **QUESTION ONE IS COMPULSORY**

: **EACH QUESTION CARRIES 25 MARKS.**

: **READ THE QUESTIONS & INSTRUCTIONS CAREFULLY**

: **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 sausages, sodium nitrate and sodium chloride are added for the following reason to;
 - A. prevent the germination of *Clostridium botulinum* spores
 - B. destroy viable *Clostridium botulinum* spores
 - C. destroy viable *Clostridium botulinum* cells
 - D. destroy all viable spores in sausages except *Clostridium botulinum* spores
 - E. B and C

2. Avidin and lysozyme are intrinsic antimicrobial substances that are found in:
 - A. garlic
 - B. sour milk
 - C. citrus fruits
 - D. eggs
 - E. B and D

4. Benzoic acid cannot be relied on to preserve food that is capable of supporting bacterial growth because:
 - A. enterobacteriaceae are resistant to it
 - B. many spoilage bacteria are quite resistant to it
 - C. it is too toxic
 - D. many spore-forming bacteria readily germinate in solutions of benzoate ions
 - E. none of the above

5. Very high intensity radiation with great penetrating power produced during decay of ^{60}Co is:
 - A. α radiation
 - B. β radiation
 - C. γ radiation
 - D. UV radiation
 - E. α radiation and β radiation

6. The primary cause of lethality in microorganisms exposed to ionizing irradiation is:
 - A. change in proteins
 - B. damage to membranes
 - C. damage to microbial DNA
 - D. enzymes inactivation
 - E. change in proteins and enzymes inactivation

7. The starter cultures of yogurt are:
- A. *Streptococcus thermophilus* & *Lactobacillus bulgaricus*
 - B. *Lactobacillus bulgaricus* & *Lactococcus lactis*
 - C. *Streptococcus thermophilus* & *Lactococcus lactis*
 - D. *Lactococcus lactis* & *Leuconostoc lactis*
 - E. None of the above
8. In Swiss cheese, the eyes are formed by the addition of:
- A. *Bifidobacterium longum*
 - B. *Propionibacterium shermanii*
 - C. *Lactobacillus acidophilus*
 - D. *Streptococcus thermophilus*
 - E. *Lactobacillus bulgaricus*
9. Which of these cheeses are ripened by the addition of molds:
- A. gouda cheese
 - B. processed cheese
 - C. cheddar cheese
 - D. cottage cheese
 - E. camembert cheese
10. If a microorganism has a maximal temperature for growth at 35 °C, a minimal temperature for growth at 5 °C, and its optimal temperature for growth is 25 °C, it is classified as a:
- A. mesophile
 - B. psychrophile
 - C. psychrotroph
 - D. thermophile
 - E. None of the above
11. The slope of the thermal death time curve is referred to as the:
- A. value
 - B. D value
 - C. F value
 - D. L value
 - E. Z value
12. UV irradiation is most useful for killing microbes:
- A. in aerosols
 - B. in air or on surface
 - C. in milk
 - D. in disinfecting water
 - E. on surface of wet or greasy foods

13. 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
14. Which of the following group of microorganisms is more sensitive to ionization?
- A. bacterial spores
 - B. gram-positive cocci
 - C. gram-positive rods
 - D. gram-negative bacteria
 - E. yeasts
15. Which one of these statements about nisin is not correct?
- A. it inhibits spore outgrowth
 - B. it is effective against molds
 - C. it is effective against only gram-positive bacteria
 - D. it is heat stable under acid conditions
 - E. it is readily inactivated by proteolytic enzymes
16. Egg white spoilage would most likely have been caused by which of these classes of microorganisms?
- A. gram-positive cocci
 - B. gram-positive rods
 - C. gram-negative rods
 - D. molds
 - E. yeasts
17. In which food product would you most likely find AFM1 toxins
- A. Cereal products
 - B. Legumes
 - C. Peanut butter
 - D. Peanuts
 - E. Meat
18. In which food product would you most likely find AFB1 toxins
- A. Cereal products
 - B. Legumes
 - C. Peanut butter
 - D. Peanuts
 - E. Meat

19. If a person consume aflatoxins with food products, there will be a.
- A. Kidney damage
 - B. Hallucination
 - C. Liver damage
 - D. Heart damage
 - E. Lung damage
20. Enzymatic browning in bruised fruits and vegetables is caused by;
- A. Peroxidase
 - B. Pectolytic
 - C. Brown mold
 - D. Phenolase
 - E. Anthracnose
21. Bacterial soft rot in fruits and vegetables is likely to be caused by;
- A. *Erwinia carotova*
 - B. *Pseudomonas marginalis*
 - C. *Xanthomonas compestris*
 - D. A and B
 - E. A, B and C
22. Which one of the statement is **not correct**?
- A. Too low temperature in storage of fruits and vegetables interferes with enzymatic system, allowing toxic substance build up resulting in pitting
 - B. Excess carbon dioxide during the storage fruits and vegetables result in chemical damage leading to brown heart in apples and pears.
 - C. Too low temperature may result in chilling injury in fruits and vegetables which may lead to woolen factor in peaches and khaki or brown color in bananas.
 - D. Proteins accounts for about 1% of a vegetable's composition, but can be as high as 4% in corn and 8% in legumes
 - E. Guavas have less vitamin C than citrus fruits
23. Which one of these statements is **not correct**?
- A. Sorbic acid has a selective antimicrobial activity
 - B. Sorbic acid is ineffective against catalase negative bacteria, molds and yeast
 - C. Chemical preservatives retard or prevent growth of undesirable microorganisms in unheated food products
 - D. Curing salts will alter the color, flavor, texture and number of microbes
 - E. Salt when used as food preservative, dehydrate the cytoplasm (plasmolysis) of microbial cell causing unfavourable osmotic gradient

24. Which one of these statements is **not correct** in relationship to coffee?
- A. The three species of coffee include *Coffea arabica*, *Coffea robusta* or *canephora* and *Coffea liberica*
 - B. The finest coffee comes from *C. arabica* and has low caffeine content
 - C. *Coffea canephora* or *robusta* is a strong, high caffeine type but of inferior quality
 - D. Brewed coffee contains about 75-150 mg of caffeine per 150 ml cup
 - E. Decaffeinated coffee, contains 30-45 mg of caffeine per 150 ml cup
25. Which one of the statements is **not correct** about caffeine?
- A. It is an alkaloid which stimulates the cortex of the brain
 - B. Small doses improves attention, concentration and coordination
 - C. It also acts on the kidney to increase water elimination
 - D. Fruit juices from citrus fruits have less caffeine than coffee and tea
 - E. Caffeine makes muscle to be less susceptible to fatigue.

[25 Marks]

Question 2

a). Labeling of all prepackaged foods to be offered to the consumer or catering purposes should conform to the codex general standard for labeling of prepackaged foods.

Define the following terms (Date marking on prepackaged food)

“Sell by date” [2]

“Best before” [2]

“Use by date” [2]

Why are these dates marked on prepackaged foods? [2]

b). Write short notes on the starter cultures used in the manufacture of cheese or yogurt.

[6]

c). What conditions are necessary for the maillard reaction to occur and give an example of a food product where this spoilage commonly occurs in?

[4]

d) In which foods are these food additives added and why?

i) Butylated Hydroxynisole[BHA] [2]

ii) Nitrate or nitrite [2]

iii) Monosodium glutamate[MSG] [2]

iv) Sodium diacetate [1]

[25 Marks]

Question 3

- a) Rye-bread is very good for people who are dieting and slimming. Why is that so? [4]
- b) Why is wheat flour preferred in the production of bread? [5]
- c) You bought a loaf of bread from the Spar supermarket and during slicing; you observe string-like structures.
What is this condition and what causes it? [3]
- d) How does low temperature affects microorganisms in food? [5]
- e). In Coca-Cola soft drinks, sodium benzoate is the preservative of choice.
Why is that so? [3]
- f) Write short notes on dietetics beverages [5]
- [25 Marks]

Question 4

- a) Discuss the effects of enzymatic activities during the spoilage of foods. Supplement your answer with appropriate examples. [10]
- b) What good use does ultraviolet (UV) irradiation have in the food establishment and what shortcomings does this method have? [7]
- c) How does emasi or fermented milks preserve food? [3]
- d) How is "UHT" milk and pasteurized milk different? [5]
- [25 Marks]

Question 5

Discuss the important roles played by temperature and oxygen in influencing the population and type of microorganisms growing on food

[25 Marks]

Question 6

- a) How do the following factors affect the quality of eggs?
- i. Diet [5]
 - ii. Age [3]
 - iii. Environment [4]
 - iv. Infections [5]
- b) How is the egg white different from the yolk? [5]
- c) How does the pH in foods affects the availability of microorganisms? [5]

[25 Marks]