



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DIPLOMA IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2005

TITLE OF PAPER : FOOD SAFETY & TECHNOLOGY

COURSE CODE : EHS 301

DURATION : 3 HOURS

MARKS : 100

INSTRUCTIONS : ANSWER ALL FIVE QUESTIONS

: EACH QUESTION CARRY 20 MARKS.

: NO PAPER SHOULD BE BROUGHT INTO NOR
OUT OF 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

1. Which diarrhoeal symptoms are associated with *Enterotoxigenic E.coli*(ETEC?)
 - A. Watery diarrhea with rice water stools
 - B. Profuse diarrhea with watery stools(blood and mucus in stools)
 - C. Watery diarrhea with mucus but no gross blood
 - D. Watery and grossly bloody diarrhea(all blood and no stools)

2. Which diarrhoeal symptoms are associated with *Enterohemorrhagic E.coli*(EHEC) *E.coli* 0157:H7?
 - A. Watery diarrhea with rice water stools
 - B. Profuse diarrhea with watery stools(blood and mucus in stools)
 - C. Watery diarrhea with mucus but no gross blood
 - D. Watery and grossly bloody diarrhea(all blood and no stools)

3. The slope of the thermal death time curve is referred to as the:
 - A. D value
 - B. F value
 - C. L value
 - D. Z value

4. The toxicity of the six most potent aflatoxins decreases in the following order.
 - A. $B_1 > M_1 > G_1 > B_2 > M_2 = G_2$
 - B. $B_2 > M_2 > G_2 > B_1 > M_1 = G_1$
 - C. $B_1 > G_1 > M_1 > B_2 > M_2 = G_2$
 - D. $B_1 > M_1 > G_1 > G_2 > M_2 = B_2$

5. The principal effect of aflatoxins produced by *Apergillus flavus* is the;
 - A. Nephrotoxins
 - B. Muscular paralysis
 - C. Liver damage
 - D. Fatty liver

6. The principal effect of onchratoxins produced by *Apergillus coherences* is the;
 - A. Nephrotoxins
 - B. Muscular paralysis
 - C. Liver damage
 - D. Fatty liver

7. Toxins produced by *Clostridium botulinum* are known as;
- Verotoxins
 - Enterotoxins
 - Neurotoxins
 - Nephrotoxins
8. In meat sausages, sodium nitrate and sodium chloride are added for the following reason to;
- Prevent the germination of *Clostridium botulinum* spores
 - Destroy viable *Clostridium botulinum* spores
 - Destroy viable *Clostridium botulinum* cells
 - Destroy all viable spores in sausages except *Clostridium botulinum* spores
9. Which of the following statements is not true;
- Botulinum toxin (E) may be destroyed at 80 °C for 10-30min or boiling for 5-15min.
 - Clostridium botulinum* type (E) will grow and produce toxin at 3.3 °C
 - Clostridium botulinum* type (C) only causes botulism in fowls, cattle and other animals.
 - Proteolytic strains of *Clostridium botulinum* prefer carbohydrate for optimum growth and will spoil food by fermentation
10. Which of these statements is not true?
- Nonproteolytic strains of *Clostridium botulinum* prefer carbohydrates for optimum growth and will spoil food by fermentation
 - Escherichia coli* will ferment carbohydrates to produce lactic acid, acetic acid and CO₂ / H₂
 - The toxins produced by *Enterotoxigenic E. coli* (ETEC) are similar or identical to Shigella toxins and therefore will produce shigella-like symptoms
 - E. coli* 0157: H7 is acid tolerant and therefore will survive and cause food borne illness in fruit juices.
11. *Listeria monocytogens* is;
- Slightly hemolytic, gram positive, halophilic, flagellated, psychrotrophic and facultative microorganism.
 - Psychrotrophic, facultative, rod shaped, gram negative microorganism
 - Slender or spirally or curved rod with a singly polar flagellum at one or both ends and microaerophilic
 - Straight or curved rod, motile with a single flagellum, halophilic and facultative microorganism

12. *Vibrio parahaemolyticus* is;
- A. Slightly hemolytic, gram positive, halophilic, flagellated, psychrotrophic and facultative microorganism.
 - B. Psychrotrophic, facultative, rod shaped, gram negative microorganism
 - C. Slender or spirally or curved rod with a singly polar flagellum at one or both ends and microaerophilic
 - D. Straight or curved rod, motile with a single flagellum, halophilic and facultative microorganism
13. *Compylobacter jejuni* is;
- A. Slightly hemolytic, gram positive, halophilic, flagellated, psychrotrophic and facultative microorganism.
 - B. Psychrotrophic, facultative, rod shaped, gram negative microorganism
 - C. Slender or spirally or curved rod with a singly polar flagellum at one or both ends and microaerophilic
 - D. Straight or curved rod, motile with a single flagellum, halophilic and facultative microorganism
14. *Yersinia enterocolitica* may be spread through
- A. Excreta of domestic and wild animals including pigs, cattle, rabbits and rodents
 - B. Excreta of warm blooded animals, human, especially poultry, and domestic pets such as cats and dogs
 - C. Food associated with zooplankton and sea foods mainly shellfish.
 - D. Common soil, dust, water, vegetation, cereals and spices.
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- A. Excreta of domestic and wild animals including pigs, cattle, rabbits and rodents
 - B. Excreta of warm blooded animals, human, especially poultry, and domestic pets such as cats and dogs
 - C. Food associated with zooplankton and sea foods mainly fish and shellfish.
 - D. Common soil, dust, water, vegetation, cereals and spices.
16. When a milking cow has consumed feedstuff containing AFB1 aflatoxin type, the resultant metabolites in milk will appear as;
- A. AFB1 aflatoxin
 - B. AFM1 aflatoxin
 - C. AFG1 aflatoxin
 - D. AFB2 aflatoxin

17. Avidin and lysozyme are intrinsic antimicrobial substances that are found in:
- garlic
 - sour milk
 - citrus fruits
 - eggs
18. Benzoic acid cannot be relied on to preserve food that is capable of supporting bacterial growth because:
- Enterobacteriaceae are resistant to it
 - Many spoilage bacteria are quite resistant to it
 - It is too toxic
 - Many spore-forming bacteria readily germinate in solutions of benzoate ions
19. Very high intensity radiation with great penetrating power produced during decay of ^{60}Co is:
- α radiation
 - β radiation
 - γ radiation
 - UV radiation
20. The primary cause of lethality in microorganisms exposed to ionizing irradiation is:
- Change in proteins
 - Damage to membranes
 - Damage to microbial DNA
 - Enzymes inactivation

Question 2

- Briefly describe the gangrenous and convulsive ergotism symptoms. [8]
 - What action is necessary in the control of staphylococcal food borne diseases? [4]
 - Outline the three major symptoms stages in *E.coli* 0157 : H7 [8]
- [20 Marks]**

Question 3

- a. Factory 'A' is canning garden peas and factory 'B' is canning pineapples. [5]
Which factory requires a botulinum cook and why it does and why the other factory does not require a botulinum cook.
- b. What symptoms are indicative of botulism in human? [6]

- c. How would you control botulism? [3]
- d. Briefly describe the causative agent of botulism. [6]
- [20 Marks]**

Question 4

- 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. [8]
- c) What conditions are necessary for the maillard reaction to occur and give an example of a food product where this spoilage commonly occur in? [4]

[20 Marks]

Question 5

- 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) In the last week of June 2002, the Ministry of Health noticed an increase in laboratory reports of *E. coli* 0157:H7 infection. Fifty –two infections had been reported that month, compared with 18 in June of 2001. In preliminary investigations, no obvious epidemiological linkages between the patients were found. The increase in cases continued into July. What could account for the increase in cases reported to the (MOH)? [8]

[20 Marks]