



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DIPLOMA IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2007

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

INSTRUCTIONS : ANSWER ANY 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 Best Answer)

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 *Enterohaemorrhagic 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 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. $B_1 > M_1 > G_1 > G_2 > M_2 = B_2$
4. The principal effect of aflatoxins produced by *Aspergillus flavus* is the;
 - A. Nephrotoxins
 - B. Muscular paralysis
 - C. Liver damage
 - D. Fatty liver
5. The principal effect of onchratoxins produced by *Aspergillus coherences* is the;
 - A. Nephrotoxins
 - B. Muscular paralysis
 - C. Liver damage
 - D. Fatty liver
6. Toxins produced by *Clostridium botulinum* are known as;
 - A. Verotoxins
 - B. Enterotoxins
 - C. Neurotoxins
 - D. Nephrotoxins

7. 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
8. 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.
9. *Listeria monocytogenes* is;
- Slightly hemolytic, gram positive, halophilic, flagellated, psychrothrophic and facultative microorganism.
 - Psychrothrophic, 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
10. *Vibrio parahaemolyticus* is;
- Slightly hemolytic, gram positive, halophilic, flagellated, psychrothrophic and facultative microorganism.
 - Psychrothrophic, 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

11. *Compylobacter jejuni* is;
 - A. Slightly hemolytic, gram positive, halophilic, flagellated, psychrothrophic and facultative microorganism.
 - B. Psychrothrophic, 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

12. *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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14. 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

15. *Thamnidium elegans* mold will attack and cause grayish to brown rot on;
 - A. Frozen red meat
 - B. Cereals and cereal products
 - C. Chilled and refrigerated meat
 - D. Fruits and vegetables

16. *Botrytis cinerea* mold will attack and cause grey to black rot on;
 - A. Frozen red meat
 - B. Cereals and cereal products
 - C. Chilled and refrigerated meat
 - D. Fruits and vegetables

17. *Cladosporium herbarum* will attack and cause black spots on;
A. Frozen red meat
B. Cereals and cereal products
C. Chilled and refrigerated meat
D. Fruits and vegetables
18. Which of these microorganisms do not belong to the enterobacteriaceae family;
A. *Salmonella enteritidis*
B. *Vibrio vulnificus*
C. *Yersinia pseudotuberculosis*
D. *Listeria monocytogenes*
19. Which of one of these foodborne microbes will produce toxins on the food during multiplication?
A. *Staphylococcus aureus*
B. *Enterotoxigenic E.coli*
C. *Shigella dysenteriae*
D. *Enterohaemorrhagic E.coli*
20. Which one of these microorganisms will grow in food stored at temperatures below 3 deg C.
A. *Compylobacter jejuni*
B. *Yersinia enterocolitica*
C. *Salmonella typhi*
D. *E.coli 0157: H7*
21. Which one of these microbes is not a halophile?
A. *Vibrio vulnificus*
B. *Listeria monocytogenes*
C. *Aeromonas hydrophila*
D. *Salmonella enteritidis*
E. *Staphylococcus aureus*
22. Which one of these microbes is not part of the enteric microorganisms?
A. *Clostridium perfringens*
B. *Salmonella paratyphi*
C. *Yersinia enterocolitica*
D. *Compylobacter jejuni*
E. *Shigella dysenteriae*

23. Which one of these causative agents has symptoms that are similar to that of *Vibrio cholera*?
- Vibrio vulnificus*
 - Enterotoxigenic *E.coli*
 - Enteroinvasive *E.coli*
 - Enteropathogenic *E.coli*
 - Enterohaemorrhagic *E.coli*
24. Which one of these mycotoxins is not produced by *Penicillium* mold?
- Yellow rice toxin
 - Ochratoxin
 - Rubratoxin
 - Patulin
 - Trichothecene
25. ----- mold will grow and build up on machinery and equipment
- Geotrichum candidum*
 - Sporotrichum thermophile*
 - Cladosporium herbarum*
 - Penicillium camembert*
 - Geotrichum fragrans*

[25 Marks]

Question 2

- a. How would you control salmonellosis diseases in food? [5]
- b. Write short notes on;
- Typhoid fever [10]
 - Aflatoxins [10]

[25 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? and why does the other factory not require a botulinum cook?
- b. What symptoms are indicative of botulism in human? [5]
- c. How would you control botulism? [5]
- d. Briefly describe the causative agent of botulism and show the growth requirements [10]

[25Marks]

Question 4

- a) Why is salmonellae microorganisms a major cause of foodborne illness in Swaziland? [15]
- b) A food survey in the Siteki town in 1998 revealed that the lettuce served with food in the restaurant had Staphylococcal microorganisms?. How did the microbe get in the food and explain the health implications. [10]

[25 Marks]

Question 5

Design an investigation plan for a foodborne outbreak control method.

[25 Marks]