



**FACULTY OF SCIENCE**

**DEPARTMENT OF FOOD TECHNOLOGY  
NATIONAL DIPLOMA IN FOOD TECHNOLOGY  
NATIONAL DIPLOMA IN BIOTECHNOLOGY**

**MODULE: FTN3BFM  
FOOD MICROBIOLOGY III  
CAMPUS: DFC**

**FINAL EXAMINATION - 2019**

**DATE: 11/ 11/ 2019**

**TIME: 08:30 – 11:30 AM**

**ASSESSORS**

**DR BC DLAMINI**

**INTERNAL MODERATOR**

**DR AO ADEBO**

**EXTERNAL MODERATOR**

**PROF FT TABIT**

**DURATION: 3 HOURS**

**TOTAL MARKS: 120**

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**NUMBER OF PAGES: 6**

**INSTRUCTIONS:**

1. Answer ALL questions.
2. Ensure your student number appears on all material you submit.
3. Questions may be answered in any sequence but **sub-sections must be answered together.**
4. Marks will be deducted for untidy handwriting
5. Hand in examination paper and answer sheet together

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**QUESTION 1**

- a) Carbonated drinks provide a good example in which “Hurdle Technology” system has been used to ensure safety. Define “Hurdle Technology” and explain the microbial inhibition methods in carbonated drinks. (15)
- b) Vegetables appear to have a more pronounced succession of microbial population during fermentation compared to fermentation of meat products. Give reasons for this and explain its implication on the safety and spoilage of food. (8)
- c) Explain the concept of LAB antagonism and explain its importance in food. (7)

**[30]**

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**QUESTION 2**

- a) Lactic acid bacteria (LAB) can be divided into two (2) groups based on their fermentation characteristics. Differentiate between the two groups and explain the importance of each group in food processing. (10)
- b) Industrial fermentations involve the use of starter cultures. Briefly discuss four reasons for starter culture problems. (8)
- c) Briefly discuss the order of utilization of nitrogen sources by brewing yeast during fermentation. (7)

**[25]**

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**QUESTION 3**

- a) Spoilage of meat must be prevented since meat is an expensive source of protein. Briefly discuss the influence of pre-slaughter handling of cows on the microbial spoilage of meat. (10)
- b) Nitrates and nitrites are included in canned meat products and sausage formulations. Briefly discuss the use of such chemicals in food and their general effects on microorganisms. (10)

**[20]**

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#### **QUESTION 4**

Write short notes on the following foodborne pathogens in terms of their (i) pathogenic/hazard characteristics, (ii) pathogenesis and (iii) types of food they are often association with.

a) *Staphylococcus aureus* (7)

b) *Clostridium botulinum* (8)

**[15]**

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#### **QUESTION 5**

a) Your company manufactures meat products and has an internal microbiology laboratory. Describe a detailed procedure on how you would determine the microbiological quality (Total aerobic count) of defrosted packaged meat products in the laboratory and explain how you will express your final results.

(10)

b) A flow diagram (Figure 1) for the manufacture of lettuce is shown below. From the diagram, develop a HACCP chart (Table 1) using the following headings: **Step; Hazard; Preventative Measure; CCP; Critical Limits; Monitoring; Corrective action**

(20)

**[30]**

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**TOTAL MARKS: 120**

## APPENDIX A

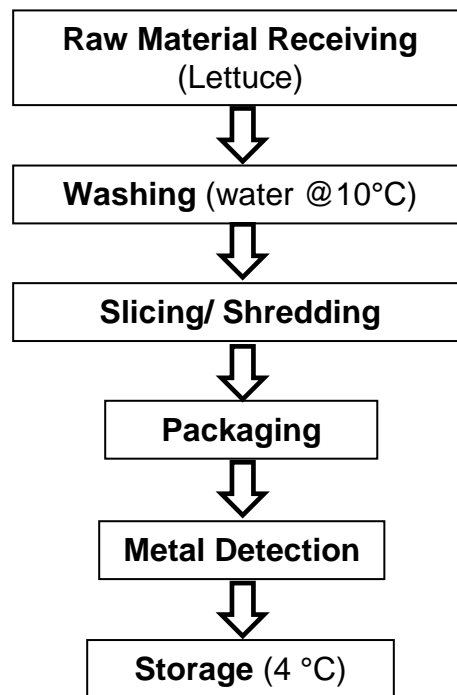


Figure 1. Flow diagram for the processing of ready-to-eat Lettuce

Table 1: HACCP Chart

STUDENT NAME: \_\_\_\_\_

[illegible]

[illegible]