



**UNIVERSITY OF SWAZILAND**  
**Faculty of Health Sciences**

**DIGREE IN ENVIRONMENTAL HEALTH WITH FOOD  
SANITATION AND TECHNOLOGY**

**MAIN EXAMINATION PAPER 2012**

**TITLE OF PAPER** : **FERMENTED FOODS**

**COURSE CODE** : **EHS 505**

**DURATION** : **2 HOURS**

**MARKS** : **100**

**INSTRUCTIONS** :

- READ THE QUESTIONS & INSTRUCTIONS CAREFULLY**
- ANSWER ANY FOUR (4) QUESTIONS**
- EACH QUESTION CARRIES 25 MARKS.**
- WRITE NEATLY & CLEARLY**
- BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.**

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.**

### Question 1

The common starter cultures used in fermented foods are from the Lactic Acid Bacteria (LAB). Some of the processes involved in substrate metabolism by LAB have to do with Oxidation – Reduction reactions.

- (a) Briefly elaborate what is Oxidation – Reduction reaction. [5 Marks]
- (b) Illustrate the process of biological Oxidation – Reduction reaction with aid of diagrams. [10 Marks]
- (c) Compare and contrast Homofermentation and Heterofermentation processes of substrate metabolism by LAB. [10 Marks]

### Question 2

- (a) Give an account of some of the main beneficial properties of fermented foods [12 Marks]
- (b) Describe the seven genera of lactic acid bacteria that are directly employed in fermentations with respect to specificgenus, cell morphology, and fermentation route. [7 Marks]
- (c) How would you differentiate;
  - (i) *Oenococcus oeni* from *Leuconostoc* spp [3 Marks]
  - (ii) *Leuconostoc* from streptococci, lactococci and pediococci [3 Marks]

### Question 3

- (a) Outline the differences between undefined and defined starter cultures. [5 Marks]
- (b) Using your knowledge of manufacture of Starter Cultures, briefly explain why the following materials are added in the production fermenter?
  - (i) Water soluble vitamins [1 Mark]
  - (ii) Surfactant Tween 80 [1 Mark]
  - (iii)  $\text{NH}_3$ ,  $\text{NH}_4\text{OH}$  or  $\text{Na}_2\text{CO}_3$  [1 Mark]
  - (iv) KOH [1 Mark]
  - (v) Catalase [1 Mark]
- (c) What is the role of meat composition with regard to meat fermentation. [5 Marks]
- (d) One of the ingredients used in manufacture of fermented sausages is sugar. Sugar is added at varying rates. What are the effects of adding sugar at higher rates? [5 Marks]
- (e) Despite *Pediococcus* and *Lactobacillus* being used as starter cultures in the manufacture of fermented sausages for the same basic role (ferment sugars and produce organic acids) they vary with respect to several vital physiological and biochemical properties. In tabular form, outline vital physiological and biochemical properties of any five (5) genera and species of *Pediococcus* and *Lactobacillus*. [5 Marks]

### Questions 4

Give a descriptive outline about the manufacture of Sauerkraut, taking into account shredding and salting, mixing, fermentation-microbial cultures, and end products. [25 Marks]

### **Questions 5**

- (a) The four distinct stages of manufacture of beer are Malting, Mashing, Fermentation and Post-Fermentation. Discuss the role of these stages with respect to their contribution to the quality of the end product (beer). **[20 Marks]**
- (b) What are the main causes of beer defects. **[5 Marks]**