



**UNIVERSITY OF SWAZILAND**  
Faculty of Health Science

Department of Environmental Health  
Sciences

Main Examination 2010

Title of paper: FOOD CHEMISTRY

Course code: EHS 501

Time allowed: 2 hours

Marks allocation: 100 Marks

**Instructions:**

- 1) Question **ONE** (1) is Compulsory
- 2) Then answer any **TWO** (2) questions
- 3) Write neatly and clearly
- 4) Begin each question in a separate sheet of paper

This paper is not to be opened until the invigilator has granted  
permission

**QUESTION 1 [COMPULSORY]**

- a. Briefly discuss structural differences that make starch digestible and cellulose indigestible  
[8 marks]
- b. Briefly describe two mechanisms by which an inhibitor can reduce the rate of enzymatic reactions.  
[8 marks]
- c. What do you understand by the primary and secondary structure of protein?  
[8 marks]
- d. What is the difference between Maillard reactions and caramelization and which of the two reactions can make amino acids unavailable?  
[8 marks]
- e. What do you understand by the term essential fatty acid in human nutrition?  
[8 marks]

[TOTAL MARKS = 40]

**QUESTION 2**

- a) A student accidentally added a lipase enzyme preparation into an oil sample and found that the oil could now form a more stable emulsion with water. Discuss the principles behind the outcome of the 'accident'.  
[20 Marks]
- b) What do you understand by the terms iodine value and saponification value and what do they indicate regarding fats and oils?  
[10 Marks]

[TOTAL MARKS = 30]

**QUESTION 3**

- a. Discuss the terms 'essential amino acid', 'limiting amino acid' and 'chemical score' in relation to protein nutritional quality?  
[15 Marks]
- b. Animal proteins are nutritionally superior to plant proteins. Discuss the validity of this statement  
[15 Marks]

[TOTAL MARKS = 30 Marks]

**QUESTION 4**

- a. Describe two positive chemical changes that occur in fruits during ripening process and two negative changes that can occur on longer storage (10 Marks)
- b. What are the chemical properties of good emulsifiers and what functions do they play in food disperse systems (10 Marks)
- c. Discuss the difference between water activity and moisture content of foods. Which one of the two has more effect on chemical and microbial reactions? (10 Marks)

***[TOTAL MARKS = 30 Marks]***