

**W1-2-60-1-6**

JOMO KENYATTA UNIVERSITY

OF A

GRICULTURE AND TECHNOLOGY

**UNIVERSITY EXAMINATIONS 2021/2022**

YEAR 5 SEMESTER 2 EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING

**AFM 2431: FOOD MICROBIOLOGY AND TOXICOLOGY**

**DATE: DECEMBER 2021 TIME: 2 HOURS**

**INSTRUCTIONS: Answer ALL Questions in Section A Compulsory) and Any Other Two**

**Questions in Section B**

**SECTION A**

1. Below are the results of a microbiological test used to identify two strains of bacteria. Identify the test and outline the procedure used. **(5 marks)**
2. Comment on the microbial stability of pasteurized milk **(5 marks**)
3. Explain the term “cold-shock” as used in food preservation **(5 marks)**
4. Explain three basic elements of food addictives **(6 marks)**
5. What is the effect of lysozyme on *Salmonea spp?* Explain **(5 marks)**
6. Outline reasons for increased prevalence of food poisoning in the recent past **(4 marks)**

**SECTION B (Answer Any Two Questions in This Section)**

Question One

1. Giving relevant examples, discuss various applications of addictives in foods **(10 marks)**
2. Discuss the procedure undertaken to guarantee the safety of food addictives **(10 marks)**

Question Two

A producer want to produce a fermentation product called Tempeh. Soy beans are soaked in lactic acidified liquor (pH=4.5), dehulled, partially cooked by steaming and then inoculated with a mold belonging to the genus *Rhizopus*. The beans have at that moment a water activity of 0.975 and a pH of 5.4. After inoculation, the inoculated beans are put in a perforated plastic bag in portions of 300g. The bags are placed for 36 hours at 30˚C to allow the mold to develop. During this process, the pH of the product is increased to 6.0. The water activity remains at 0.975. After fermentation, the product is vacuum-packaged and pasteurized in the package at 80˚C (in the coldest spot of the bag) for 10 min. After pasteurization, the product is quickly chilled (within 2 hours) to 70˚C and sold as such. The product is stored at 7˚C.

1. What type of spoilage will be expected in the finished product during storage at 7˚C

**(8 marks)**

1. What food pathogens would form a problem regarding the microbial safety of the product, taking into account the process **(7 marks)**
2. Highlight the benefits of lactic fermentation in food preservation **(5 marks)**

Question Three

Anaerobic *L. monocytogenes* and aerobic *Aclnetobacter moraxella* are commonly implicated in the spoilage of chicken meat. (A*ssume 25˚C* *storage temperature*).

1. In a single axis, illustrate using a graph the growth pattern of these micro-organisms in vaccum-packed fresh meat during 7 days of storage and explain any possible variation in the growth profile of these micro-organisms. **(10 marks)**

1. Assuming the curves above represent the growth profile of *L. monocytogenes* in meat chicken breast, in the same axes and graph as in (a) above, draw the growth profile of *L. monocytogenes*  in meat from chicken legs. Explain any variation in the growth profile of *L. monocytogenes* between the two organ meats **(10 marks)**