5.04

Final written exam: FOOD FERMENTATION (BT304C)

The advanced BSc. Biotechnology

Time: 90 minutes

*** Question 1:** (2 marks)

There are some benefits in food fermentation. Please indicate four (4) benefits, and for each of these benefits, give one example.

*** Question 2:** (2 marks)

When metabolizing glucose in a homofermentative way, *Lactobacillus plantarum* produces 2 moles of lactate per mole of glucose. Explain in which steps energy is consumed and produced and what is the net gain of energy. Explain also which steps in the metabolic pathway ensure the redox balance.

*** Question 3:** (2 marks)

Explain the difference between "food infection" and "food intoxication". Indicate the factors determining the food-borne disease in term of food infection.

*** Question 4:** (1 marks)

Which of the following sugars can be transported into the living cell of *Saccharomyces cerevisiae*: glucose, maltose, sucrose? From a wort containing both glucose and maltose, it was observed that glucose was consumed first, and that uptake of maltose started after glucose had been depleted. How could this sequential uptake be explained?

*** Question 5:** (1 marks)

Explain how the process is called as "starter-mediated multiple stage fermentation"? Please give a name of one kind of fermented product that belonged to this kind of fermentation.

*** Question 6: Case study** (2 marks)

Kombucha is a fermented beverage obtained from tea (the watery extract of tea leaves) with about 15% sugar added. As a result of the fermentation, said to be dominated by acetic acid bacteria and yeasts, the pH is reduced and a thick layer of jelly-like material is formed at the tea surface. This jelly is also used to inoculate new batches of tea.

You are interested to investigate the predominant microflora as well as the major biochemical changes taking place during the fermentation. You can use a well-equipped laboratory and you have a few weeks time.

(1) formulate 2-3 concrete aims

(2) describe an experimental design to achieve your aims

Verification of Department

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Lecturer

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5.04

Student Assignment

Food Fermentation Course (BT304C) - The advanced BSc. Biotechnology

The class is divided into groups of 2 students/group. Each group is assigned a food/beverage commodity. Make sure each group chooses a different product.
The members of each group are required to meet outside of lecture time and discuss the following questions with respect to the microbiology of their product.

* What kind of product is chosen?

* What are materials and ingredients involved?

* What is manufacture procedure?

* What are the main microorganisms associated and their roles?

* What are any benefit and nutrition concerned?

The group is requested to bring to class an example of a product within their assigned commodity, and to give a talk of 5-7 minutes to briefly present the answers of the group to the class for subsequent class discussion.

NOTE: Suggestion about the commodity type, such as:

Cooked rice product
Ready - to - eat packaged product
Fresh meat product
Fresh seafood product
Fresh fruit product
Bakery product
Fermented dairy product
Fermented meat/ seafood product
Fermented vegetable product

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Final written exam: FOOD MICROBIOLOGY (FS440C)

The advanced BSc. Biotechnology

Time: 90 minutes

*** Question 1:** (2 marks)

Indicate the names of at least four (4) essential parameters governing microbial growth and survival. Of which, take two (2) of these representative parameters and describe what factors affect them, respectively?

*** Question 2:** (2 marks)

Where do the infective microbes come from? Where do the toxin-procedures come from? How does food-borne disease happen?

*** Question 3:** (2 marks)

What foods are most frequently associated with outbreaks of food-borne illness caused by *Bacillus cereus*? What the main symptoms and how to control them?

*** Question 4:** (2 marks)

Please give names of two genera of spore-forming bacteria that contain important pathogens? Select one of these two genera, then describe briefly the characteristics and commonly implicated foods of this genus?

*** Question 5:** Case study of Vietnamese rice-based alcoholic beverages (2 marks)

What kinds of microorganisms mainly involved in the fermentation of traditional rice-based alcoholic beverage? Please characterize briefly the principle of traditional rice-based alcoholic beverages?

Although the essence of traditional fermentations is that they have solved the practical problems of how to, on most occasions, ensure a successful fermentation, it is evident that the scientific basis of many aspects of the fermentations are poorly understood or not understood at all. Can you suggest at least three (3) questions that remain unanswered regarding traditional Vietnamese alcoholic beverages?

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Student Assignment

Food Microbiology Course (FS440C) - The advanced BSc. Biotechnology

The class is divided into groups of 2 students/group. Each group is assigned a food/beverage commodity. Make sure each group chooses a different product.
The members of each group are required to meet outside of lecture time and discuss the following questions with respect to the microbiology of their product.

* What are the points in the production and service chain that are likely to cause contamination of the product with microorganisms?
* What will be the most likely population of microorganisms (cfu/gram or ml) at the time of consumption if produced and handled under good manufacturing and service procedures? What would be the predominant species or microbial group?
* How would you know if this product was spoiled? What species are likely to cause this spoilage? How could this spoilage be prevented?
* What is the risk of this product causing an outbreak of food poisoning? What would be the likely organism responsible for this poisoning/ disease? How could this risk can be minimized/ decreased?
* What microbiological specifications or standards would you propose for your product?

The group is requested to bring to class an example of a product within their assigned commodity, and to give a talk of 5-7 minutes to briefly present the answers of the group to the class for subsequent class discussion.

NOTE: Suggestion about the commodity type, such as:

Cooked rice product
Ready - to - eat packaged product
Fresh meat product
Fresh seafood product
Fresh fruit product
Bakery product
Fermented dairy product
Fermented meat/ seafood product
Fermented vegetable product

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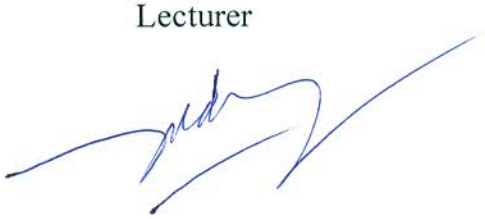

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Final written exam: BIOTECHNOLOGY SEMINAR I (BT199C)

The advanced BSc. Biotechnology

Time: 90 minutes

*** Question 1:** (4 marks)

Explain the meaning of the following 16 scientific terms: Prokaryotes, Eukaryotes, Phycology, Mycology, Probiotic, Biodiversity, CFU, Virology, Biotechnology, Psychrophiles, Mesophiles, Thermophiles, Tissue, Photosynthesis, Pasteurization, Sterilization.

*** Question 2:** (3 marks)

Indicate 15 words that you know and give their definitions in the context of scientific meaning.

Note: these 15 words **must be different** from the 16 words mentioned in Question 1.

*** Question 3:** (3 marks)

During your visit tour to the laboratories of our Biotechnology Research & Development Institute, you were introduced about the essential research topics, including Molecular Biology, Plant Tissue Culture, Microbiology, Biochemistry and Food Biotechnology.

Please express one research topic that you are most interested in and explain the reasons why?

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Final written exam: BIOTECHNOLOGY SEMINAR V (BT299C)

The advanced BSc. Biotechnology

Time: 120 minutes

Based on the references, your own presentation and research project regarding your research proposal of the coming thesis, please provide three (3) following issues:

* **Question 1:** (1 marks)

State the title of your proposed research project.

* **Question 2:** (6 marks)

Describe briefly (in one paragraph with about 300 words) about your proposed research project, including an overview, the objectives, the experimental activities with corresponding methods and the expected outputs.

* **Question 3:** (3 marks)

Provide statements about the reasons to choose your proposed research topic and any applications that can be derived from the findings of your proposed research.

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