UNIVERSITI SAINS MALAYSIA

Supplementary Semester Examination
Academic Session 2009/2010

June 2010

IMK 308 – FOOD PRESERVATION PRINCIPLES
[PRINSIP PENGAWETAN MAKANAN]

Duration: 3 hours
[Masa: 3 jam]

Please check that the examination paper consists of **FIVE (5)** pages of printed material before you begin this examination.

Answer **FIVE** questions. All questions can be answered in Bahasa Malaysia OR English.

In the event of any discrepancies, the English version shall be used.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi **LIMA (5)** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.*

*Jawab **LIMA** soalan. Semua soalan boleh dijawab dalam Bahasa Malaysia ATAU Bahasa Inggeris.*

Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah diguna pakai].

Answer any FIVE out of seven questions below.

1. Answer both parts of this question:

   (a) List FIVE factors of food spoilage

   (10 marks)

   (b) Briefly describe how foods can be preserved by lowering its water activity.

   (10 marks)

2. Answer both parts of this question:

   (a) List THREE reasons for drying food products

   (3 marks)

   (b) Sketch and describe briefly a typical drying curve of a food product.

   (7 marks)

   (c) Explain why case hardening can happen and how would you reduce its occurrence during drying.

   (10 marks)

3. Explain the preservation principles of the following products:

   (a) UHT milk

   (10 marks)

   (b) Canned fruit cocktails

   (10 marks)

4. Answer all parts to this question:

   (a) Draw a flowchart for the production of hard ice cream

   (5 marks)

   (b) Explain the effects of freezing rate on the final quality of frozen food products

   (10 marks)

   (c) Explain the term “freeze-concentration”

   (5 marks)

5. Write short notes on the followings:

   (a) F_o

   (5 marks)

   (b) Vapor compression cycle

   (5 marks)

   (c) How hurdle concept can be applied to preserve food products.

   (10 marks)

6. Answer both parts of this question:

   (a) Fermentation process affects the characterization of the final product. By giving two (2) examples of products, discuss the effects of fermentation on the color, flavour and nutritional value of that particular product.

   (16 marks)

   (b) Briefly discuss the differences between gamma rays and x-rays?

   (4 marks)

7. Answer both parts of this question:

   (a) In brief discuss how the factors of pH, Partition coefficient and food ingredients can influence the effectiveness of the food preservatives.

   (13 marks)

   (b) Explain how browning can be prevented by the use of sulfite.

   (7 marks)

Jawab mana-mana LIMA soalan daripada tujuh soalan berikut.

1. *Jawab kedua-dua bahagian soalan ini:*

   (a) *Senaraikan LIMA faktor kerosakan makanan.*

   (10 markah)

   (b) *Huraikan secara ringkas bagaimana makanan boleh diawet dengan menurunkan nilai aktiviti airnya.*

   (10 markah)

2. *Jawab semua bahagian soalan ini:*

   (a) *Senaraikan TIGA sebab untuk pengeringan makanan.*

   (3 markah)

   (b) *Lakarkan dan huraikan secara ringkas kurva pengeringan tipikal untuk sesuatu produk makanan.*

   (7 markah)

   (c) *Jelaskan mengapa "case hardening" boleh berlaku dan bagaimana anda boleh mengurangkannya daripada berlaku semasa pengeringan.*

   (10 markah)

3. *Jelaskan prinsip pengawetan bagi produk berikut:*

   (a) *Susu UHT*

   (10 markah)

   (b) *Koktel buah-buahan terkaleng*

   (10 markah)

4. *Jawab semua soalan berikut:*

   (a) *Lukis suatu carta alir bagi penghasilan ais krim keras*

   (5 markah)

   (b) *Jelaskan kesan kadar penyejukbekuan ke atas kualiti akhir produk tersejuk beku*

   (10 markah)

   (c) *Jelaskan terminologi "pemekatan-tersejukbeku"*

   (5 markah)

5. *Tulis nota ringkas bagi yang berikut:*

   (a) F_o

   (5 markah)

   (b) Kitaran pemampatan wap

   (5 markah)

   (c) Bagaimana konsep pagar (hurdles concept) dapat diaplikasikan untuk tujuan pengawetan produk makanan.

   (10 markah)

6. *Jawab kedua-dua bahagian soalan ini:*

   (a) Proses fermentasi mempengaruhi ciri – ciri produk akhir yang dihasilkan. Dengan memberi dua (2) contoh produk, bincangkan kesan fermentasi terhadap warna, perisa dan nilai nutrisi produk tersebut.

   (16 markah)

   (b) Bincangkan secara ringkas perbezaan antara sinaran gamma dan sinaran X

   (4 markah)

7. *Jawab kedua-dua bahagian soalan ini:*

   (a) Bincangkan secara ringkas bagaimana faktor-faktor pH, koefisien pemisah dan ingredien makanan dapat mempengaruhi keberkesanan bahan pengawet.

   (13 markah)

   (b) Terangkan bagaimana pemerangan dapat dihalang dengan penggunaan sulfit.

   (7 markah)

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