
UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Pertama
Sidang Akademik 2005/2006

November 2005

IMK 302 – Teknologi Produk Primer Tempatan Terpilih

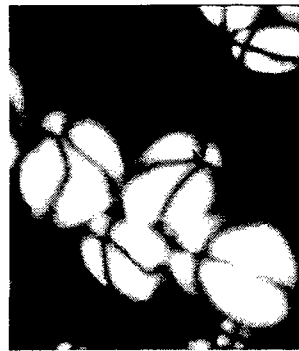
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Sila pastikan bahawa kertas peperiksaan ini mengandungi **SEPULUH (10)** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.

Jawab **EMPAT (4)** soalan. Semua soalan mesti dijawab dalam Bahasa Malaysia.

1. Jawab semua bahagian soalan berikut:

- (a) Rajah 1 menunjukkan granul kanji yang dilihat di bawah mikroskop satah berkutub (*polarized microscope*). Apakah fenomena yang diperhatikan dalam Rajah 1? Apakah kaitannya dengan struktur granul? Apakah pengaruh pemprosesan (contohnya pemanasan pada suhu 90 °C selama 15 minit) terhadap fenomena ini?

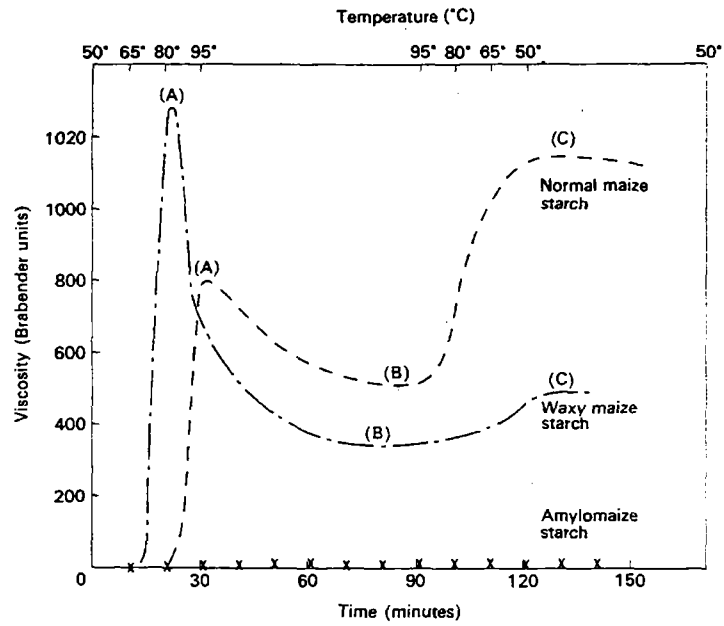


Rajah 1

(5 markah)

- (b) Rajah 2 menunjukkan profil pempesanan bagi 3 jenis kanji, iaitu jagung biasa (*normal maize*), kanji jagung lilin (*waxy maize*) dan kanji beramilosa tinggi (*amylomaize*). Beri ulasan tentang profil yang diperhatikan bagi 3 jenis kanji tersebut.

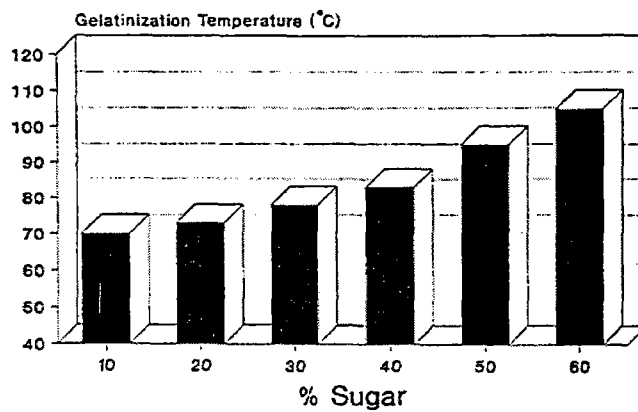
(10 markah)



Rajah 2

- (c) Rajah 3 menunjukkan kesan kepekatan gula yang berlainan terhadap suhu gelatinisasi kanji. Mengapakah tren sedemikian diperhatikan? Apakah implikasinya apabila produk yang mengandungi kanji dan 60% gula diproses haba?

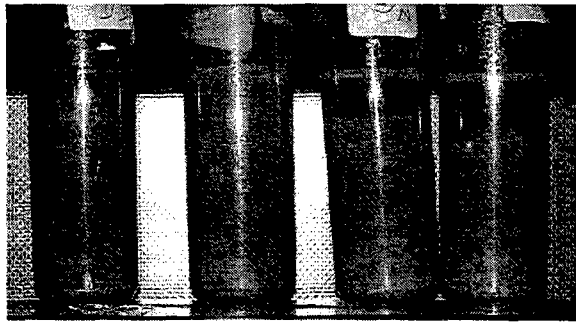
(10 markah)



Rajah 3

2. Jawab semua bahagian soalan berikut:

- (a) Rajah 4 menunjukkan empat sampel pes kanji yang telah mengalami lima kitaran sejuk beku-cair (freeze-thaw cycle). Apakah nama fenomenon yang diperhatikan dalam Rajah 4? Bagaimana ia berlaku? Apakah jenis kanji yang cenderung menunjukkan kelakuan sedemikian? Bagaimanakah masalah ini dapat dihindarkan?

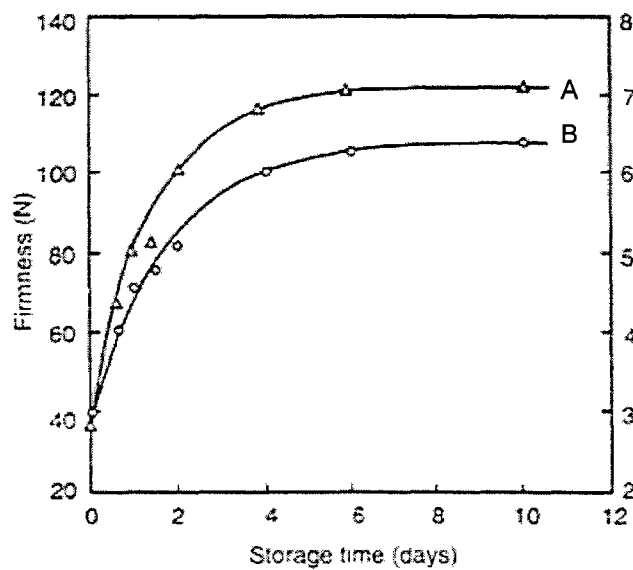


Rajah 4

(7 markah)

- (b) Rajah 5 menunjukkan perubahan dalam kekerasan roti (roti A dan B) semasa penstoran. Jelaskan perubahan yang berlaku terhadap komponen kanji dan mengapa profil sedemikian diperhatikan. Mengapa terdapat perbezaan profil kekerasan bagi roti A dan roti B?

(10 markah)



Rajah 5

- (c) Mengapakah pengubahsuaian pautsilang dan penstabilan digabungkan dalam sesuatu jenis kanji? Bagaimana gabungan pengubahsuaian ini dapat dimanfaatkan dalam pemprosesan kanji/produk berasaskan kanji?

(8 markah)

3. Jawab semua bahagian soalan berikut:

- (a) Apakah yang dimaksudkan dengan istilah “speciality fats”? Berikan contoh-contoh yang sesuai.

(7 markah)

- (b) Mengapakah minyak sawit dan minyak kernel sawit merupakan bahan mentah yang sesuai digunakan untuk menghasilkan mentega koko setara?

(10 markah)

- (c) Bincangkan dua (2) contoh penggunaan minyak sawit dan pecahan-pecahannya dalam penghasilan lemak bukan tenusu.

(8 markah)

4. Jawab semua bahagian soalan berikut:

- (a) Apakah kaedah-kaedah pengekstrakan minyak/lemak (dari sumber tumbuhan) yang biasa digunakan? Apakah faktor-faktor yang menentukan pemilihan sesuatu kaedah pengekstrakan yang sesuai?

(12 markah)

- (b) Terangkan maksud “selectivity” dalam proses penghidrogenan.

(5 markah)

- (c) Percampuran minyak (oils/fats blending) kerap digunakan dalam industri minyak dan lemak. Dengan memberikan contoh-contoh yang sesuai, bincangkan rasional dan kepentingan operasi ini.

(8 markah)

5. Tulis catatan ringkas mengenai perkara-perkara berikut:

(a) Kanji tidak cukup masak (*under-cooked starch*) dan kanji terlampau masak (*over-cooked starch*)

(8 markah)

(b) Kanji “pengisi kelikatan” (*fill viscosity starch*)

(5 markah)

(c) Minyak sawit olein, minyak sawit stearin, minyak kernel sawit, minyak sawit pecahan pertengahan

(12 markah)

1. Answer all parts of the following question:

- (a) Figure 1 shows the starch granules observed under polarized microscope. What is the phenomenon observed in Figure 1? How does it relate to the structure of the granules? What are the effects of processing (for example heating at 90 °C for 15 min) on this phenomenon?



Figure 1

(5 marks)

- (b) Figure 2 shows the pasting profile for 3 starches, namely, normal maize, waxy maize and high amylose maize. Give your comment on the pasting profile of the 3 starches.

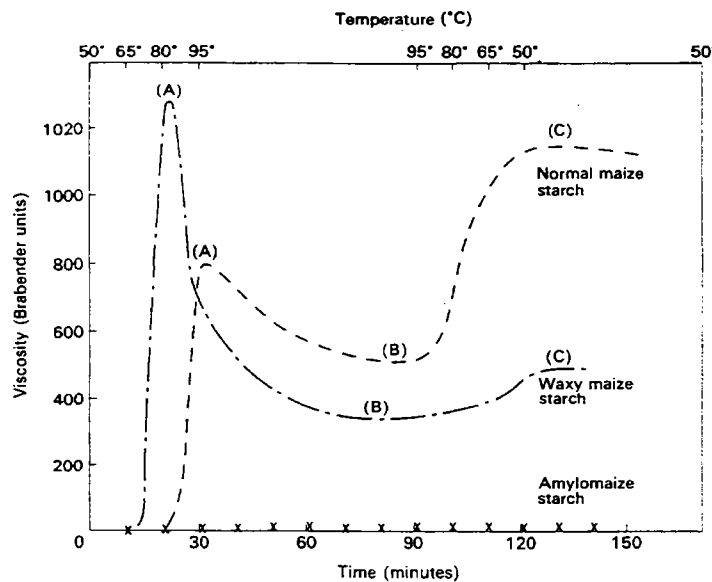


Figure 2

(10 marks)

- (c) Figure 3 shows the effect of sugar at different concentrations on the gelatinization temperature of starch. Why such trend is observed? What is the implication when a product containing 60% sugar is heat-processed?

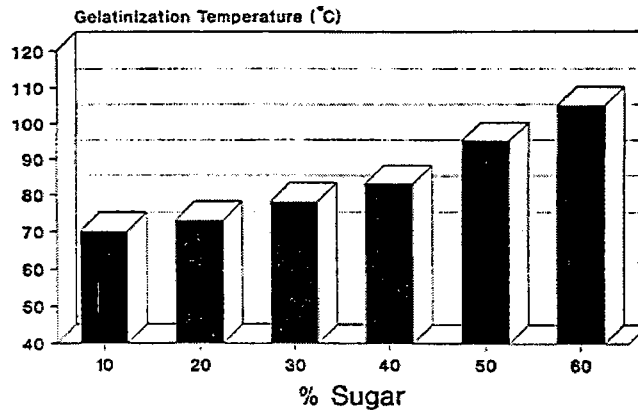


Figure 3

(10 marks)

2. Answer all parts of the following question:

- (a) Figure 4 shows four starch paste samples after being subjected to five freeze-thaw cycles. What is the phenomenon observed in Figure 4? How does it come about? Which starch is more prone to such phenomenon? How can this problem be overcome?

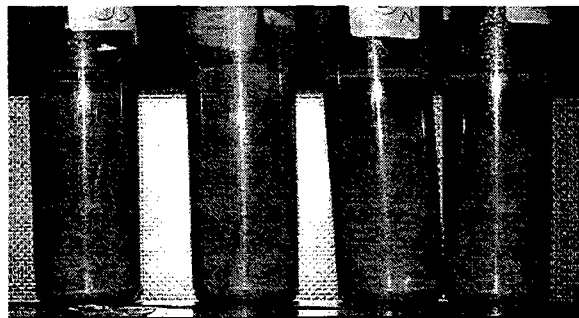


Figure 4

(7 marks)

- (b) Figure 5 shows the changes in the firmness of bread (bread A and B) during storage. Explain the changes with respect to the starch component and why such profile was observed. Why is different profile in bread firmness observed for bread A and B?

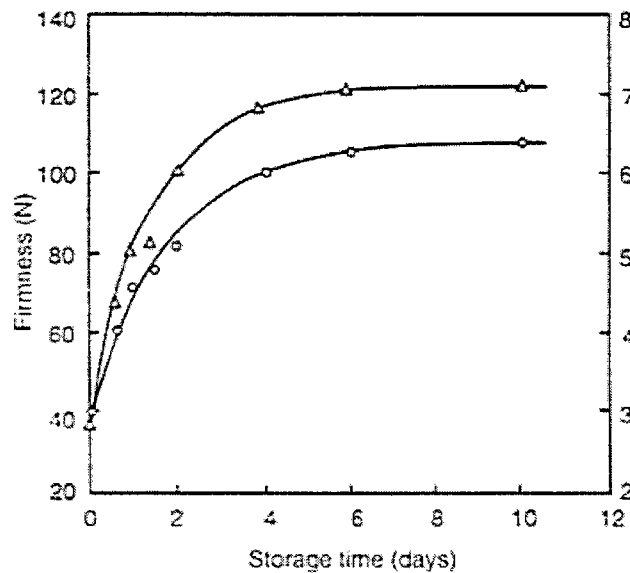


Figure 5

(7 marks)

- (c) A starch can be chemically modified by combining crosslinking and stabilization. Why is this necessary? How can this combined modification be benefitted in the processing of starch-based products?

(8 marks)

3. Answer all parts of the following question:

- (a) What is meant by the term "speciality fats"? Give appropriate examples.

(7 marks)

- (b) Why are palm oil and palm kernel oil suitable raw material for producing cocoa butter equivalents?

(10 marks)

- (c) Discuss two (2) examples of the usage of palm oil and its fractions in the production of nondairy fats.

(8 marks)

...10/-

4. Answer all parts of the following question:

(a) What are the extraction methods commonly used for extracting oils from plant sources? What are the factors to be considered in choosing the appropriate method of extraction?

(12 marks)

(b) Explain the meaning of "selectivity" in the hydrogenation process.

(5 marks)

(c) Oils/fats blending is frequently used in the fats and oils industries. By giving appropriate examples, discuss the rationale and importance of this operation.

(8 marks)

5. Write short notes on the followings:

(a) Under-cooked starch and over-cooked starch

(8 marks)

(b) Fill viscosity starch

(5 marks)

(c) Palm olein, palm stearin, palm kernel oil, palm mid-fractions

(12 marks)