

1. 請由食品主要組成份之角度，說明菌產品與穀類、肉類、牛乳的主要差異。(10%)
2. 請由食品化學的角度論述，闡述造成「米粉」與「冬粉」質地差異的原因。(12%)
3. 請解釋下列名詞的意義(僅翻譯為中文不給分): (total 40%)
 - (1) Rancidification
 - (2) Juice haze
 - (3) Caramelization
 - (4) Anthocyanidin
 - (5) Bleaching agents
 - (6) Tannins
 - (7) Michaelis-Menten constant
 - (8) Niacin
 - (9) Hydrocolloids
 - (10) Phospholipids

3. 有關於酵素性褐變，請回答下列問題: (total 12%)
 - (1) 請列出 phenolase browning 的反應式，並舉例說明食品成份的化學變化。(6%)
 - (2) 如何控制酵素性褐變的發生？有哪些方法？(6%)

4. 閱讀測驗: (total 16%)

Chemically, the chlorophylls may be altered in many ways but in food processing the most common alteration is pheophytinization, which is the replacement of the central magnesium by hydrogen and the consequent formation of the dull olive-brown pheophytins. It is difficult to explain the drastic color shift of green chlorophylls to the dull olive-brown pheophytins by simply visualizing the replacement of magnesium by hydrogen. The accepted structural formula of pheophytin is normally shown this way, but it is likely that some shift in the porphyrin resonance structure is also involved. Chlorophyllides may be formed by the removal of the phytol chain. These compounds are green and have essentially the same spectral properties as the chlorophylls; however, they are more water soluble than the chlorophylls. If the magnesium in the chlorophyllides is removed, the corresponding pheophorbides are formed which have the same color and spectral properties as the pheophytins.

食品加工的過程，可能會造成 chlorophylls 的不安定。請根據上段文字回答下列問題:

- (1) Chlorophylls 不安定時，最常見的反應稱為 pheophytinization，使其色澤下降，可能是為什麼？(4%)
- (2) Chlorophyllides 可能如何產生？(4%)
- (3) Chlorophyllides 與 chlorophylls 有哪些性質相同？哪些性質相異？(4%)
- (3) Pheophytin 與 Pheophorbide 有哪些性質相同？哪些性質相異？(4%)

5. 芸香科柑橘類果實的主要苦味成份有哪些？可以透過哪些方法去除柑橘類果汁的苦味？(10%)