



國立臺灣海洋大學 100 學年度博士班招生考試試題

考試科目： 食品科學綜論

系所名稱： 食品科學系博士班

1. 答案以橫式由左至右書寫。2. 請依題號順序作答。

1. 假設在模擬動物腸胃道環境的實驗模式，發現海藻發酵液A可以抑制 α -amylase及 α -glucosidase活性。請設計後續研究以驗證A的保健機能，內容包括：研究假說、體內外研究模式、實驗分組、實驗方法及其分析原理。(15%)
2. 請解釋DRIs。(5%)
3. Please summarize the results of the following study in 1 or 2 sentences. (中英文皆可)(5%)

Vitamins C and E and Beta Carotene Supplementation and Cancer Risk: A Randomized Controlled Trial

Background	Observational studies suggested that a diet high in fruits and vegetables, both of which are rich with antioxidants, may prevent cancer development. However, findings from randomized trials of the association between antioxidant use and cancer risk have been mostly negative.
Methods	From 8171 women who were randomly assigned in the Women's Antioxidant Cardiovascular Study, a double-blind, placebo-controlled 2 x 2 x 2 factorial trial of vitamin C (500 mg of ascorbic acid daily), natural-source vitamin E (600 IU of α -tocopherol every other day), and beta carotene (50 mg every other day), 7627 women who were free of cancer before random assignment were selected for this study. Diagnoses and deaths from cancer at a specific site were confirmed by use of hospital reports and the National Death Index. Cox proportional hazards regression models were used to assess hazard ratios (represented as relative risks [RRs]) of common cancers associated with use of antioxidants, either individually or in combination. Subgroup analyses were conducted to determine if duration of use modified the association of supplement use with cancer risk. All statistical tests were two-sided.
Results	During an average 9.4 years of treatment, 624 women developed incident invasive cancer and 176 women died from cancer. There were no statistically significant effects of use of any antioxidant on total cancer incidence. Compared with the placebo group, the RRs were 1.11 (95% confidence interval [CI] = 0.95 to 1.30) in the vitamin C group, 0.93 (95% CI = 0.79 to 1.09) in the vitamin E group, and 1.00 (95% CI = 0.85 to 1.17) in the beta carotene group. Similarly, no effects of these antioxidants were observed on cancer mortality. Compared with the placebo group, the RRs were 1.28 (95% CI = 0.95 to 1.73) in the vitamin C group, 0.87 (95% CI = 0.65 to 1.17) in the vitamin E group, and 0.84 (95% CI = 0.62 to 1.13) in the beta carotene group. Duration and combined use of the three antioxidants also had no effect on cancer incidence and cancer death.



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4. Describing the factors on freezing rate when the thermal conductivity of material was considered. (5%)
5. Designing an ideal transportation of cold chain for frozen foods and living shrimp without water, respectively. (10%)
6. What is the key point of food processing? For what reasons there were focused by food manufacturer, maker and technologist? And then they are how to solve and use it? (10%)
7. Use any components derived from food as examples to describe the reaction mechanisms including reactants, products, and key steps for Maillard, and enzymic browning reactions. What are significances of nutritional, color, flavor, and texture qualities of foods due to Maillard, and enzymic browning reactions? How to control both reactions? (15%)
8. Glossary: (10%)
 - (1) Lipid autooxidation
 - (2) Dough formation
 - (3) Starch retrogradation
 - (4) Postmortem degradation
 - (5) Allosteric regulation
9. Based on end products of glucose metabolism, lactic acid bacteria can be divided into two groups. Please **define** these two types of lactic acid bacteria and **describe** their roles in food fermentation (10%)
10. Please describe and explain the intrinsic and extrinsic factors of food, which affect microbial growth. (15%)