

ICCN Poster Presentations

Food processing and human health

A tomato puree enriched in 6% tomato skin leads to a higher absorption of lycopene and β -carotene than a classical tomato puree in healthy subjects

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Background: epidemiological studies reported that a high tomato intake is associated with a lower incidence of colorectal and prostate cancers. This beneficial effect could be related to a high intake of carotenoids such as lycopene or β -carotene.

Objective: because tomato skins, usually eliminated during classic tomato puree processing, are a source of lycopene and β -carotene, the aim of this study was to assess whether a tomato puree enriched in tomato skins (6%) induced a higher absorption of these carotenoids than a classic tomato puree in healthy subjects.

Design: 8 healthy men were given two similar meals containing either skin-enriched tomato puree (meal 1) or classic tomato puree (meal 2) at a one-month interval. Meal 1 provided 48 mg total lycopene (all-*trans* + *cis* forms) and about 1.5 mg total β -carotene. Meal 2 provided 30 mg total lycopene and about 1 mg total β -carotene. Blood samples were collected before meal intake and 1, 2, 3, 4, 6 and 8 h after meal ingestion to follow the change in chylomicron carotenoid concentrations. Chylomicrons were isolated by ultracentrifugation and analysed to assess their carotenoid concentration by hplc. Chylomicron carotenoid responses (area under the curve) were calculated for each meal and compared with the non-parametric wilcoxon test. P value below 0.05 were considered significant.

Results and discussion: chylomicron total lycopene and β -carotene concentrations exhibited bell shaped curves after both meals, with a maximum reached at about 3 h. Both chylomicron total lycopene and β -carotene responses were higher after the meal 1 than after the meal 2 ($p = 0.069$ and $p = 0.036$, respectively). The fact that chylomicron lycopene and β -carotene auc ratio (auc after meal 1/auc after meal 2) was similar to that of lycopene and β -carotene amounts in meal 1 / amounts in meal 2 demonstrated that the bioavailability of these carotenoids in tomato skin appeared equivalent to that of these carotenoids in tomato pulp.

Conclusion: skin-enrichment of tomato purees would represent a good way to valorise tomato co-products and to enhance the consumption of lycopene and β -carotene.

To ensure high standards of food safety through an integrated haccp system

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Introduction: Singapore General Hospital, Dietetics & Nutrition Services Department caters to 3,600 – 4,000 meals daily. Our customers are patients who would be defined as people at a higher risk for food-borne illness. Apart from the unwell, we are also serving patients who are pregnant, the elderly and the patients who are even more vulnerable, with compromised immune system. Foodborne illness is therefore a major concern, minimising and controlling biological, chemical and physical hazards in food is critical for food safety.

Method: All 370 normal and therapeutic dishes for the different ethnic cuisine were included. Meals include breakfast, lunch, dinner and afternoon tea snacks. Dishes are divided by process into groups of meat, vegetable, rice, bread, fruit, baked items, cold desserts, and yoghurts. With the HACCP system, the various stages of identification and minimisation of the food hazards would pre-empt preventive steps to be taken before rather than an after response to the food borne problem after it has occurred. Good Manufacturing Practices, fundamental food hygiene principles, controls and monitoring systems were then identified from receiving of raw food materials through storage, preparation, cooking, individual portioning and holding to the transporting of finished dishes to the 1,600 in-patients. Training of supervisory, cooks and other staff who handle food on HACCP Awareness were scheduled according to their designation or duties; using various methods to overcome language barriers (Malay, Tamil, Mandarin, local dialects, etc.), mindsets and 'resistance to change' of some older staff.

Results: Benefits of certification include internal process improvement, a reduction from 3-4 complaints per 100,000 food orders to 1-2 complaints per 100,000 food orders. Compared to the temperature feedback of year 2002, there was an improvement of 19% in excellent ratings and reduction of 50% in poor temperature ratings. HACCP being internationally recognized and targeted for Preventive Food Poisoning also provides further assurance to enhance confidence in the food served to patients in SGH.

Conclusion: In 23 September 2003, the hospital kitchen joined the elite 15% of the food industry who achieved HACCP certification in Singapore, and the first in-house kitchen to be awarded the certification. This certification has not only improved the standards of food safety but also other aspects of food served to patients.