EFFECT OF PROCESSING AND SUBSEQUENT STORAGE ON NUTRITION

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OBJECTIVE

To determine the effects of thermal processing, freeze drying, irradiation, and storage time on the nutritional content of food
To evaluate the nutritional content of the food items currently used on the International Space Station and Shuttle
To establish the need to institute countermeasures

(This study does not seek to address the effect of things on nutrients in detail, but rather aims to place in context the overall nutritional status at the time of consumption)

BACKGROUND

Food products for space feeding systems are processed to commercial sterility
While heat sterilization is the most effective food preservation process, it affects vitamin and protein quality
The dehydration process has the smallest impact on nutrients
Micronutrient stability is dependent upon the composite macronutrients matrix
Stability is difficult to extrapolate between systems
Food Composition Database does not take into account the effects of processing

JUSTIFICATION

Food with a 3-5 year shelf-life will be required for a mission to Mars
Most loss during processing and subsequent storage can be significant
Nutrition requirements are delivered via the food system
The quantity of nutrients, e.g., vitamins, at consumption is currently unknown
Nutrients play a vital role in facilitating the capability of astronauts to tolerate physiological changes
As mission durations increase, physiology changes gain importance

DELIVERABLES

Conduct a literature review to better understand the potential effects of retorting, freeze drying and irradiation on nutrient loss
Determine the effect of processing on representative flight food products by comparing the calculated nutrition to the actual nutrition one month after processing
Determine the effect of subsequent storage on nutrition by comparing the one month nutrition analysis results with those at 1 year and 3 years
Determine the capability of the current food system to provide adequate nutrition for long duration missions

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