Food Mass Reduction Trade Study

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ABSTRACT

Food system optimization will require total system resources to be minimized. Weight of food item is one factor in a total system approach. Weight optimization opportunities exist by increasing fat and decreasing water content in food items. Meal replacement options would be an efficient manner of delivering nutrition. Crew acceptability of meal replacement options will determine degree of use.

BACKGROUND

AFT System

Current Menu Analysis

Food system optimization will require total system resources to be minimized. Weight of food item is one factor in a total system approach. Weight optimization opportunities exist by increasing fat and decreasing water content in food items. Meal replacement options would be an efficient manner of delivering nutrition. Crew acceptability of meal replacement options will determine degree of use.

RESULTS AND DISCUSSION

Current Menu Analysis

Food Weight Reduction with Adjusted Moisture and Fat Content

By the end of this study, an estimate of the mass and volume savings will be provided to the Constellation Program. In addition, if new technologies need to be developed to achieve the desired goal, these technologies, timeline, and budget will be identified at the end of the project.

JUSTIFICATION

The National Aeronautics and Space Administration (NASA) is working towards future long duration manned space flights to the Lunar surface by 2020 and to the Mars surface within the next 20 years. The primary goal of the Advanced Food Technologies (AFT) project is to develop a multi-meal food system for future space missions that will enable NASA to provide the crew with a safe, nutritious, and acceptable food system while efficiently balancing appropriate vehicle resources such as mass, volume, power, water, and cleanliness. Often, this project has focused on maintaining the quality of the food system can result in a higher mass and volume. By the end of this study, an estimate of the mass and volume savings will be provided to the Constellation Program. In addition, if new technologies need to be developed to achieve the desired goal, these technologies, timeline, and budget will be identified at the end of the project.

CONCLUSIONS

Opportunities for weight reduction in the food system exist. The food item form influences nutrient concentration and extent of necessary preparation prior to consumption. Fat content is below their maximum allowable values leaving room for improvement. Currently available meal replacement options are lacking nutritional and organoleptic properties. Maintaining crew member acceptability will be the primary challenge in implementing the meal replacement options. Increasing fat and decreasing moisture content in the current food system could decrease mass by as much as 22%.

REFERENCES