Task Book Report Generated on: 04/19/2024

Fiscal Vers: FY 2018 Task Last Updated: FY 01232018 PIN Nume: Service Ann Ps.D. Project Title: Soublitzed Foods for Use in Extended Spaceflight: Preservation of Shelf-Life. Nursient Content and Acceptability Division Name: Human Research Programs/Discipline: HUMAN RESEARCH Programs/Discipline: HUMAN RESEARCH Programs/Discipline: HUMAN RESEARCH Fregrams/Discipline: HUMAN RESEARCH Fregrams/Discipline: HUMAN RESEARCH Fregrams/Discipline: United States Programs Relates: (1) HUMAN RESEARCH—Space Human Factors Prigneering Human Research Program Elements: (1) HUMCHouran Health Countermeasures Human Research Program Relates: (1) Food and Nutrition/Risk of Performance Decrement and Crew Ulmess Due to Inadequate Food and Nutrition Space Biology Special Category: None PI Email: None Space Biology Special Category: None PI Email: Programization Type: GOVERNMENT Phone: 508-233-4516 Organization Type: GOVERNMENT Phone: 508-233-4516 Organization Name: United States Department of the Army PI Address 2: U.S. Army Natick Soldier Systems Center PI Address 2: U.S. Army Natick Soldier Systems Center PI Address 3: State: MA 21p Code: O1769-5018 Congressional District: 7 Comments: City: Natick State: MA 21p Code: O1769-5018 Congressional District: 7 Comments: Solditation / Funding 2011 Crew Health Solver: Natick State: MA 21p Code: O1769-5018 Congressional District: 7 Comments: On O Post Dore: O No. of Phot Degree: 0 No. of Phot Dore: O No. of Master' Degrees: 0 No. of Phot Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master' Degrees: 0 No. of Master's Candidates: O No. of Master	Fiscal Year:	FY 2018	Task Last Undated	EV 01/23/2018
Project Title: Stabilized Foods for Use in Extended Spacellight: Preservation of Shelf-Life, Nutrient Content and Acceptability Program/Discipline: HUMAN RESEARCH Program/Discipline: HIMAN RESEARCH HIMAN RESEARCH Freelment/Sunfidepline: HIMAN RESEARCH Freelment/Sunfidepline: HIMAN RESEARCH Freelment/Sunfidepline: HIMAN RESEARCH Freelment/Sunfidepline: No Human Research Program Elements: (I) HIMC-Human Health Countermeasures Human Research Program Risks: (I) Frood and Nutrition/Risk of Performance Decrement and Crew Illiness Due to Inadequate Food and Nutrition Space Biology Special Category: None Pl Email: None Space Biology Special Category: None Pl Email: In India States Department of the Army Pl Organization Type: GOVERNENT Floore: 508-233-4516 Organization Name: United States Department of the Army Pl Address 1: NSDREC, CFD PORT, RDNS-CFP Pl Address 2: U.S. Army Natick Soldier Systems Center Pl Web Page: City: Natick State: MA Zip Code: 01760-5018			rask Last Opuated:	1 1 01/23/2010
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Program/Discipline: HUMAN RESEARCH Program/Discipline- Element/Subdiscipline- Element/Subdiscipline- Element/Subdiscipline- Element/Subdiscipline- Joint Agency Name: TechPort: No Human Research Program Elements: (1) HHC-Hornan Health Countermeasures Human Research Program Elements: (1) HHC-Hornan Health Countermeasures Human Research Program Elements: (1) HHC-Hornan Health Countermeasures Human Research Program Elements: (1) Hord and Nutrition-Risk of Performance Decement and Crew Illness Due to Inadequate Food and Nutrition Space Biology Cross-Element Discipline: None Space Biology Cross-Element Discipline: None Space Biology Cross-Element Discipline: None PI Email: Plant Program Elements One PI Email: Plant Program Elements Discipline: None PI Email: Plant Program Elements Organization Type: GOVERMENT Phone: 508-233-4516 Organization Name: United States Department of the Army PI Address 1: NSDREC, CED/PORT, RDNS-CFP PI Address 1: NSDREC, CED/PORT, RDNS-CFP PI Address 2: U.S. Army Natick Soldier Systems Center PI Web Page: City: Natick Natick One None State: MA Zip Code: State: MA Zip Code: State: MA Zip Code: One None Solicitation / Funding 2011 Crew Health Source: NSHITZSA002NA Start Date: Horlifold End District: 1031/2017 No. of Post Docs: ON. No. of Master' Degrees: 0 No. of Post Docs: ON. No. of Master' Degrees: 0 No. of Post Docs: ON. No. of Master' Degrees: 0 No. of Master's Candidates: ON. No. of Master' Degrees: 0 No. of Master's Candidates: ON. No. of Master' Degrees: ON. ON. OT	rroject ride.	Stabilized Foods for Ose in Extended Spaceringht: Preservation of Shelf-Life, Nutrient Content and Acceptability		
Frogram/Discipline- Element's Undiscipline- Alban's RESEARCH-Space Human Factors Engineering No.	Division Name:	Human Research		
Element/Suddisciplline: No TechPort: No No	Program/Discipline:	HUMAN RESEARCH		
Human Research Program Elements: (I) HIIC-Human Health Countermeasures Human Research Program Risks: (I) Food and Nutrition/Risk of Performance Decrement and Crew Illness Due to Inadequate Food and Nutrition Space Biology Element: None Space Biology Cross-Element None Space Biology Special Category: None PI Email: ann.humants.iv/ginnal.mil Fax: FY PI Organization Type: GOVERNMENT Phone: 508-233-4516 Organization Name: United States Department of the Army PI Address 1: NSDREC, CPD/PORT, RDNS-CFP PI Address 2: U.S. Army Natick Soldier Systems Center PI Web Page: City: Natick State: MA Zip Code: O1760-5018 Congressional District: 7 Comments: Project Type: GROUND Solication / Funding 2011 Crew Health Source: NNJ11ZSA002NA Start Date: 1101/2012 End Date: 10031/2017 No. of Post Ducs: O No. of PhD Candidates: O No. of PhD Candidates: O No. of Master' Degrees: O No. of Master's Candidates: O No. of Bachelor's Degrees: O No. of Master's Candidates: O No. of Bachelor's Degrees: O No. of Master's Candidates: O No. of Bachelor's Degrees: O No. of Bachelor's Candidates: O No. of Bachelor's Degrees: O No. of Master's Candidates: O No. of Bachelor's Degrees: O No. of Bachelor's Candidates: O No. of Bachelor's Degrees: O No. of Master's Candidates: O No. of Bachelor's Degrees: O No. of Master's Candidates: O No. of Bachelor's Degrees: O No. of Bachel		HUMAN RESEARCHSpace Human Factors Engineering		
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Space Biology Cross-Element Discipline: None PI Email: ann hosprett cividinal mil Fax: FY PI Organization Type: GOVERNMENT Phone: 508-233-4516 Organization Type: GOVERNMENT Phone: 508-233-4516 Organization Type: GOVERNMENT Phone: 508-233-4516 Organization Name: United States Department of the Army PI Address 1: NSDREC, CFD/PORT, RDNS-CFP PI Address 2: U.S. Army Natick Soldier Systems Center PI Web Page: City: Natick State: MA Zip Code: O1760-5018 Congressional District: 7 Comments: Project Type: GROUND Solicitation / Funding 2011 Crew Health Source: NNJ112SA002NA Start Date: 11/01/2012 End Date: 10/31/2017 No. of Post Docs: No. of Phs Decress: No. of Phs Decress: No. of Phs Decress: No. of Master's Candidates: No. of Bachelor's Candidates: O No. of Bachelor's Candidates: O No. of Bachelor's Candidates: O No. of Bachelor's Candidates: No. of Bachelor's	Human Research Program Risks:	(1) Food and Nutrition: Risk of Performance Decrement and Crew Illness Due to Inadequate Food and Nutrition		
Discipline: "None Space Biology Special Category: None PI Email: ann.hairett.civ@mail.mil Fax: FY PI Organization Type: GOVERNMENT Phone: 508-233-4516 Organization Name: United States Department of the Army PI Address 1: NSDREC, CFD/PORT, RDNS-CFP PI Address 2: U.S. Army Natick Soldier Systems Center PI Web Page: City: Natick State: MA Zip Code: O166-5018 Congressional District: 7 Comments: Project Type: GROUND Solicitation / Funding 2011 Crew Health Source: NSUILZSA002NA Start Date: 11/01/2012 Read Date: 10/31/2017 No. of Past Dots: O No. of Master' Degrees: O No. of Path Dean didates: O No. of Master' Degrees: O No. of Master's Candidates: O No. of Master' Degrees: O No. of Bachelor's Candidates: O No. of Bachelor's Degrees: O No. of Bachelor's Candidates: O Monitoring Center: NASA JSC Contact Email: grace Ldouglas@masa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 179/17), NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Projo, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Performance Goal No.:	Space Biology Element:	None		
Pl Email: ann h.barrett.civ/@mail.mil Fax: FY		None		
Pl Organization Type: GOVERNMENT Phone: 508-233-4516 Organization Name: United States Department of the Army Pl Address 1: NSDREC, CFD/PORT, RDNS-CFP Pl Address 2: U.S. Army Natick Soldier Systems Center Pl Web Page: City: Natick State: MA Zip Code: 01760-5018 Congressional District: 7 Comments: Project Type: GROUND Solicitation / Funding 2011 Crew Health Source: NNJIIZSA002NA Start Date: 11/01/2012 End Date: 10/31/2017 No. of Post Docs: 0 No. of PhD Degrees: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of Master's Candidates: 0 No. of Master's Degrees: 0 No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC Contact Monitor: Douglas, Grace Contact Phone: Contact Homit: grace Ldouglas@nasa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 1/2/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Performance Goal No.:	Space Biology Special Category:	None		
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PI Address 1: NSDREC, CFD/PORT, RDNS-CFP PI Address 2: U.S. Army Natick Soldier Systems Center PI Web Page: City: Natick State: MA Zip Code: 01760-5018 Congressional District: 7 Comments: Project Type: GROUND Solicitation / Funding 2011 Crew Health Source: NNJ11ZSA002NA Start Date: 11/01/2012 End Date: 10/31/2017 No. of Post Does: 0 No. of PhD Degrees: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC Contact Monitor: Douglas, Grace Contact Phone: Contact Email: panel Idouglas@masa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army)	PI Organization Type:	GOVERNMENT	Phone:	508-233-4516
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Comments: Project Type: GROUND Solicitation / Funding 2011 Crew Health Source: NNJ11ZSA002NA Start Date: 11/01/2012 End Date: 10/31/2017 No. of Post Docs: 0 No. of PhD Degrees: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of Master's Candidates: 0 No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC Contact Monitor: Douglas, Grace Contact Phone: Contact Email: grace.l.douglas@nasa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Rorant/Contract No.: NNJ13HA911 Performance Goal No.:	City:	Natick	State:	MA
Project Type: GROUND Solicitation / Funding 2011 Crew Health Source: NNJ11ZSA002NA Start Date: 11/01/2012 End Date: 10/31/2017 No. of Post Docs: 0 No. of PhD Degrees: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC Contact Monitor: Contact Email: grace_l.douglas@nasa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army)	Zip Code:	01760-5018	Congressional District:	7
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No. of Post Docs: No. of PhD Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Master's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Degrees: No. of Bachelor's Degrees: No. of Bachelor's Candidates: Douglas, Grace Contact Phone: Contact Email: grace.l.douglas@nasa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Rrant/Contract No.: NNJ13HA911 Performance Goal No.:	Project Type:	GROUND		
No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC Contact Monitor: Douglas, Grace Contact Phone: Contact Email: grace.l.douglas@nasa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Grant/Contract No.: NNJ13HA911 Performance Goal No.:	Start Date:	11/01/2012	End Date:	10/31/2017
No. of Master's Candidates: 0	No. of Post Docs:	0	No. of PhD Degrees:	0
No. of Bachelor's Candidates: Contact Monitor: Douglas, Grace Contact Phone: Contact Email: grace.l.douglas@nasa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Grant/Contract No.: NNJ13HA911 Performance Goal No.:	No. of PhD Candidates:	0	No. of Master' Degrees:	0
Contact Monitor: Douglas, Grace Contact Phone: Contact Email: Plight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Grant/Contract No.: NNJ13HA911 Performance Goal No.:	No. of Master's Candidates:	0	No. of Bachelor's Degrees:	0
Contact Email: grace.l.douglas@nasa.gov Flight Program: NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Grant/Contract No.: NNJ13HA911 Performance Goal No.:	No. of Bachelor's Candidates:	0	Monitoring Center:	NASA JSC
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NOTE: Element change to Human Health Countermeasures; previously Space Human Factors & Habitability (Ed., 1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) NNJ13HA911 Performance Goal No.:	Contact Email:	grace.l.douglas@nasa.gov		
Flight Assignment: NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15) NOTE: Changed from NSBRI to NASA-monitored project, per M. Perchonok/NASA JSC (Ed., 2/25/2013) Key Personnel Changes/Previous PI: N/A COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) Grant/Contract No.: NNJ13HA911 Performance Goal No.:	Flight Program:			
COI Name (Institution): Froio, Danielle M.S. (United States Department of the Army) Richardson, Michelle M.S. (United States Department of the Army) NNJ13HA911 Performance Goal No.:	Flight Assignment:	1/19/17) NOTE: End date changed to 10/31/2017 per G. Douglas/JSC (Ed., 12/14/15)		
Richardson, Michelle M.S. (United States Department of the Army) Grant/Contract No.: NNJ13HA911 Performance Goal No.:	Key Personnel Changes/Previous PI:	N/A		
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Task Book Report Generated on: 04/19/2024

Task Description:

The objective of this effort is to develop shelf stable, highly acceptable, food with increased nutrient (vitamins) stability for extended space missions utilizing innovative processing and packaging technologies. There will be two research thrusts. For the first thrust area, we will formulate, test, and optimize the quality and nutrient content of a range of fortified shelf-stable foods. The focus will be on extruded/pressed low-water activity bar-type products. Advances in innovative pre-treatment technologies (encapsulation) for vitamins will be assessed, as well as synergy with matrix chemical character. For the second thrust area, different packaging technologies will be investigated with research focused on the interaction of packaging material with various innovative sterilization processes such as microwave heating, irradiation, and high pressure treatment. The availability of highly nutritious and health-promoting food is a factor that is a significant prerequisite for prolonged space travel. The design of feeding and nutritional strategies for multi-year, non-resupplied flights is an undertaking requiring substantial research and development; it is also an endeavor and that could be founded upon our existing, considerable knowledge and experience base at Natick Soldier RD&E (Research, Development and Engineering) Center.

Rationale for HRP Directed Research:

Research Impact/Earth Benefits:

The proposed study will yield strategies for the development of extremely stable, nutrient-dense foods and the development of packaging materials compatible with new quality-preserving sterilization techniques. While this work is specifically important to the health of astronauts, its significance also extends to the research that is critical to the mission of the Natick Soldier Research Development and Engineering Center: to support and promote the nutritional health of the Warfighter on extended missions with little or no means of resupply.

VITAMIN LOSSES AFTER 3 YEARS AT 70F

Vitamin levels in relatively low and high fat content compressed bars and dispersed drink mixes, fortified with twice the Space Flight Requirement for vitamins A, B1, B9, C, and E, were analyzed after three years storage at 70F. Vitamins in relatively low fat products had been encapsulated in a lipophilic coating; vitamins in relatively high fat products had been encapsulated in a starch-based coating. Vitamin contents were measured by Covance Co., with n=6.

Losses for the vitamins after 3 years storage at 70F are as follows.

Vitamin A: low and high fat bars—15 % (both); low and high fat beverage bases—17% and 16%, respectively.

Vitamin B1: low and high fat bars—23% and 8.5%, respectively; low and high fat beverage bases—4.8 and 23%, respectively.

Vitamin B9: low and high fat bars—26% and 21%, respectively; low and high fat beverage bases—30% and 26%, respectively.

Vitamin C: low and high fat bars—11% and 5.7%, respectively; low and high fat beverage bases—4.8% and 7.4%, respectively.

Vitamin E: low and high fat bars—4.9% and 3.7%, respectively; low and high fat beverage bases—4.6% and 8.4%, respectively.

Results show that vitamin loss susceptibility after 3 years storage, on average, followed the sequence, B9 > A > B1 > C > E

Task Progress:

Overall effects of product form (i.e., compressed bars vs. powders) and of relative product fat level were calculated using paired two-sample T-test comparisons of pooled data, with populations of 60 values/replicates in each data set. In general, percent losses were higher (~25%) in the dispersed particulate beverage bases, with moderate statistical significance. Compacted bars may be slightly more stable against oxidation-induced degradation of vitamins due to inhibited contact of packaging-entrained oxygen with the interior of the products. While, on average, lower fat products exhibited slightly less (~12%) vitamin degradation than did high fat products, this effect had low statistical significance.

Testing of pouches and food product at time 0, 3, and 6 months at 100F and time 0 and 6 months at 70F has been completed. Samples have also been pulled for 1 year at 100 and 70F, and testing of food and package is currently underway. Testing of food components included sensory, vitamin, color, and water activity analysis. Package testing included barrier, seal strength, mechanical, and burst testing. Prior to package testing, food product was emptied from pouches and pouches were cleaned with soapy water and dried. Sample identification for package testing is as follows: (1) the control sample is the unfilled and unprocessed pouch, (2) t=0 samples represent pouch data immediately after processing, (3) t=3 months and t=6 months indicates samples that were pulled at the respective time intervals. Pouch integrity testing shows that Pouch B/retort undergoes a 10-14% decrease in seal strength after processing (t=0); however, seal strength begins to slightly increase after storage at 100F. Pouch A (MATS/retort/irradiation) shows a slight increase in seal strength going from control (unprocessed pouch) to t=0 (after processing), then drops back down to a value close to the control value at 3 months (100F) and 6 months (70F), before increasing to maximum value at 6 months (100F).

ED. NOTE (June 2021): Project continues with Principal Investigator (PI) Danielle Froio-Blumsack continuing work initiated with PI Dr. Ann Barrett, whose work covered the first 3 years of this contract with U.S. Army. See "Stabilized Foods for Use in Extended Spaceflight: Preservation of Shelf-Life, Nutrient Content and Acceptability (Froio-Blumsack)" for subsequent reporting.

Bibliography Type:

Description: (Last Updated: 08/25/2020)

Articles in Peer-reviewed Journals

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Barrett AH, Richardson MJ, Froio DF, Connor LFO, Anderson DJ, Ndou TV. "Long-term vitamin stabilization in low moisture products for NASA: Techniques and three-year vitamin retention, sensory, and texture results." J Food Sci. 2018 Aug;83(8):2183-90. https://doi.org/10.1111/1750-3841.14218; PMID: 30059142, Aug-2018

Task Book Report Generated on: 04/19/2024