

Fiscal Year:	FY 2017	Task Last Updated:	FY 08/29/2017
PI Name:	Wheeler, Raymond Ph.D.		
Project Title:	Baseline Microbial Assessment of Fresh Produce		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline-- Element/Subdiscipline:			
Joint Agency Name:		TechPort:	No
Human Research Program Elements:	(1) HHC: Human Health Countermeasures		
Human Research Program Risks:	(1) Microhost: Risk of Adverse Health Effects Due to Host-Microorganism Interactions		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	NASA CENTER	Phone:	321-861-2950
Organization Name:	NASA Kennedy Space Center		
PI Address 1:	NASA Exploration Research and Technology		
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PI Web Page:			
City:	Kennedy Space Center	State:	FL
Zip Code:	32899-0001	Congressional District:	8
Comments:			
Project Type:	Ground	Solicitation / Funding Source:	Directed Research
Start Date:	07/31/2017	End Date:	09/30/2018
No. of Post Docs:		No. of PhD Degrees:	
No. of PhD Candidates:		No. of Master' Degrees:	
No. of Master's Candidates:		No. of Bachelor's Degrees:	
No. of Bachelor's Candidates:		Monitoring Center:	NASA JSC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Massa, Gioia Ph.D. (NASA Kennedy Space Center) Hummerick, Mary M.S. (Vencore/ NASA Kennedy Space Center)		
Grant/Contract No.:	Directed Research		
Performance Goal No.:			
Performance Goal Text:	Currently no standards or requirements exist for microbial food safety for space-grown produce (fresh plant foods). Without standards it is difficult to assess options for handling and sanitizing produce on the International Space Station (ISS) and during future exploration missions. We will conduct a literature review of microbial levels on fresh food, and then measure microbial counts on crops purchased from the grocery store or grown in a controlled environment. Products tested will include lettuce, mizuna, cherry tomato, pepper, and radish, all of which are candidate crops for pick-and-eat testing on ISS and near term exploration missions. Growth chamber conditions will be set to mimic an ISS or spacecraft environment. Products will be assayed for specific pathogens (Enterobacteriaceae, Salmonella sp., and Aspergillus flavus) and total culturable microorganisms using aerobic plate counts, and total yeast and mold counts will be assessed. Analyses will follow the FDA (Food & Drug Administration) Bacteriological Analytical Manual methods.		

Task Description:	<p>The goal of the project is to establish a baseline for expected microbial levels found on fresh plant foods that might be grown on ISS and near term missions, and develop risk assessment and microbial safety recommendations for these types of fresh foods.</p> <p>SA 1. Review the literature to gather available baseline microbial levels from crops grown in greenhouses or other controlled environments, as well as information on current commercial produce standards.</p> <p>SA 2. Assess store-bought produce to recommend baseline microbial levels for fresh produce in space.</p> <p>SA 3. Grow crops in controlled environments under ISS-relevant conditions and assess baseline microbial levels.</p> <p>SA 4. Compile data from SAs 1-3 and develop microbial safety recommendations for specific types of produce and assess risk of contamination in flight.</p>
Rationale for HRP Directed Research:	<p>This research is directed because it contains highly constrained research, which requires focused and constrained data gathering and analysis that is more appropriately obtained through a non-competitive proposal. This study will establish baseline microbial levels for a number of crops being tested or under consideration for spaceflight food production. No current standards or requirements exist for fresh produce grown in spaceflight and this study will provide baseline data to establish those standards. The Kennedy Space Center (KSC) Life Sciences group has unique expertise with vegetable production using the Veggie system, and has on-site controlled environment plant production facilities that enable testing to occur under ISS and Veggie growth conditions. KSC has worked through board certification (MOG, Safety) for produce already consumed in spaceflight on a case by case basis, and standards for this process are needed considering a variety of new crops are intended to be grown on ISS for spaceflight consumption in the next few years. KSC has the expertise and knowledge to complete this task and submit recommendations for fresh produce handling and microbial requirements for board consideration (FACB) prior to planned Veggie production experiments in spaceflight.</p>
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2017.
Bibliography Type:	Description: (Last Updated: 02/08/2019)