Effect of low shear modeled microgravity (LSMMG) on the probiotic Lactobacillus acidophilus ATCC 4356

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The introduction of generally recognized as safe (GRAS) probiotic microbes into the spaceflight food system has the potential for use as a safe, non-invasive, daily countermeasure to crew microbiome and immune dysregulation. However, the microgravity effects on the stress tolerances and genetic expression of probiotic bacteria must be determined to confirm translation of strain benefits and to identify potential for optimization of growth, survival, and strain selection for spaceflight. The work presented here demonstrates the translation of characteristics of a GRAS probiotic bacteria to a microgravity analog environment. *Lactobacillus acidophilus* ATCC 4356 was grown in the low shear modeled microgravity (LSMMG) orientation and the control orientation in the rotating wall vessel (RWV) to determine the effect of LSMMG on the growth, survival through stress challenge, and gene expression of the strain. No differences were observed between the LSMMG and control grown *L. acidophilus*, suggesting that the strain will behave similarly in spaceflight and may be expected to confer Earth-based benefits.