

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Applications of Space Medicine to Earth-Related Health Issues (3)

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HARNESSING FUNCTIONAL FOOD STRATEGIES FOR THE HEALTH CHALLENGES OF SPACE
TRAVEL

Abstract

Numerous health challenges face astronauts during long-duration space missions, including diminished immunity, bone loss, and increased risk of radiation-induced carcinogenesis. Changes in the intestinal flora of astronauts may contribute to these problems. Soy-based fermented food products could provide a nutritional strategy to help alleviate these challenges by incorporating beneficial lactic acid bacteria, while reaping the benefits of soy isoflavones. We carried out strain selection for the development of soy ferments, selecting strains of lactic acid bacteria showing the most effective growth and fermentation ability in soy milk (*Streptococcus thermophilus* ST5, *Bifidobacterium longum* R0175 and *Lactobacillus helveticus* R0052). Immunomodulatory bioactivity of selected ferments was assessed using an in vitro challenge system with human intestinal epithelial and macrophage cell lines, and selected ferments show the ability to down-regulate production of the pro-inflammatory cytokine Interleukin-8 following challenge with Tumour Necrosis Factor-alpha. The impact of fermentation on vitamin B1 and B6 levels and on isoflavone biotransformation to agluconic forms was also assessed, with strain variation-dependent biotransformation ability detected. Overall this suggests that probiotic bacteria can be successfully utilized to develop soy-based fermented products targeted against health problems associated with long-term space travel.