

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Environmental Control, Life Support and EVA Systems (6)

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DEVELOPMENT AND CERTIFICATION OF KOREAN SPACE FOODS BY COLLABORATION  
BETWEEN KAERI AND IBMP

**Abstract**

Four Korean foods (*Kimchi*, ready-to-eat fermented vegetable; *Ramen*, ready-to-cook noodles; Nutrition bar; *Sujeonggwa*, cinnamon beverage) were developed by Korea Atomic Energy Research Institute (KAERI) as space foods sterilized by high-dose gamma irradiation. The space foods were then certificated for the use in space flight conditions by the Russian Institute of Biomedical Problems (IBMP) to be supplied to the first Korean astronaut, So-Yeon Lee, who accomplished space missions at the International Space Station (ISS) in 2008. Addition of calcium lactate and vitamin C, a mild heating, deep-freezing, and gamma irradiation at 25 kGy were conducted to prepare *Kimchi* as a ready-to-eat space food. Sterilization of the space *Kimchi* (SK) was confirmed by a microbiological test. The hardness of the SK was lower than the untreated *Kimchi* (CON), but higher than the irradiated only *Kimchi*. Sensory attributes of the SK were similar to CON, and maintained during preservation at 35°C for 30 days. The optimal doses to destroy the contaminated microbes and to maintain the qualities of the Nutrition bar, *Ramen*, and *Sujeonggwa* were determined to be 15, 10 and 6 kGy, respectively. The certification tests such as a microbial test and an organoleptic test were conducted under the space-simulated environment in 51 days. Briefly, the space foods were preserved for 21 days at 20°C and then 30 days at 25°C at fluctuating temperatures up to 30°C for 24 hr and up to 35°C for 48 hr. These are maximally close to the conditions of a space environment. Climate and organoleptic tests were conducted by experts from the Science and Research Institute for Food Concentrate Industry and Special Food Technology. Microbiological tests were performed by specialists from the Test Laboratory Center of the Federal Biomedical Agency. Based on the results of the performed tests, four Korean space foods were certified by IBMP for their use in space flight conditions within 30 days after their delivery on board the ISS.