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Uptake of Radioactive Cesium by Intestinal and Probiotic Bacteria

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Large amounts of radioactive materials emitted by the Fukushima Daiichi nuclear power plant (FNPP) accident in March 2011 have caused a heavy environmental pollution. Especially, food contamination by radioactive cesium (Cs) made headlines throughout the world. Germanium gamma-ray spectrometry detected peaks from ¹³⁴Cs and ¹³⁷Cs in the grasses. Stray cattle ate them at evacuation zone within 20km of FNPP. To demonstrate the decontamination mechanism from human and animals, we conducted the uptake of radioactive Cs by intestinal and probiotics bacteria.

We prepared brain-heart infusion (BHI) medium containing radioactive Cs, and inoculated *Bifidobacterium longum*, *Clostridium perfringens*, *Clostridium ramosum*, *Bacteroides fragilis*, and *Bacteroides vulgates*. Similarly, *B. longum*, *B. breve*, *Lactobacillus gasseri*, *Lactobacillus casei* and *Lactobacillus delbrueckii* subsp. *bulgaricus* were inoculated onto the de Man, Rogosa, and Sharpe (MRS) medium containing radioactive Cs. After 48 hours, radioactive Cs uptake of bacterium was examined. Uptake rate ranged from 37.8 to 81.2 % in *Bifidobacterium*, *Clostridium* and *Bacteroides*, by contrast *Lactobacillus* only 2-3%. These results indicate that intestinal bacteria could take in radioactive Cs as efficient scavengers. On the other hand, *Lactobacillus* did not showed uptake efficiently. We presumed potassium (K) in medium inhibited uptake of Cs. So, we investigated the K concentration of these mediums. The K concentration of BHI and MRS medium was 0.02% and 0.14%, respectively. K concentration of MRS is significantly higher than BHI. The result indicated that K inhibited bacterium uptake of radioactive Cs. As a future activity, we will carry out experiments on medium of low K concentration.