



# Title: Single-Laboratory Validation Study on Simultaneous Detection of $\alpha$ & $\beta$ Radioactivity in Food Using Liquid Scintillation and Gas-flow Proportional Counting Techniques

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## ➤ Background

### At time of a nuclear/radiological emergency, prompt detection & sustainable monitoring are crucial

- Demand for rapid food testing increases exponentially during the early phase of the incident like the Fukushima Daiichi nuclear accident
- High demand for food testing can persist for several years

## ➤ Need a robust, versatile, & simple detection technique for effective countermeasure

### Develop & validate a candidate method via a single-lab study

- Develop radiochemical procedure using priority & representative foods
- Optimize instrument settings for simultaneous  $\alpha$  &  $\beta$  detection
- Analyze various foods spiked with  $\alpha$  &  $\beta$  radionuclides by two analysts using different instruments
- Design an analytical scheme to gather data for assessing method performance via statistical analysis

## ➤ Study results

### The method is successfully developed & validated

- A total of 96 food samples are analyzed for  $\alpha$  &  $\beta$  radioactivity using the developed method
- All results meet  $\pm 30\%$  acceptance criteria, except a few outliers due to contamination
- The method shows repeatability of 1–14% for  $\alpha$  &  $\beta$  radionuclides in various types of foods analyzed
- The method achieves a sample throughput of 8 samples per analyst in 7 hrs.

## ➤ Future Study

### A collaborative multi-lab study utilizing the method for matrix extension

- Official method for Food Emergency Response Network (FERN)
- ASTM standard method
- Implement the method within FERN rad lab network to enhance food testing capacity