

## **Analysis Method to Determine the Correct Food Labeling**

EISAKU KOMORI

Chief Director

Food Labeling Monitoring Department

Food and Agricultural Materials Inspection Center

### **< Summary >**

I will introduce you the technological authentication methods used for the monitoring of food labeling in Food and Agricultural Materials Inspection Center (FAMIC): Deoxyribonucleic and (DNA) analysis, elemental analysis, stable isotope analysis, and others.

Even if the morphological features are similar to those of food items, some of the contents will be different in the food ingredients. Also, the food content will vary according to the differences: the proportion of composition to the ingredients, and the production method. Making use of these, and focusing and analyzing some characteristic content in the food, we can identify on whether the food labeling is correct or not. For example, lipids have characteristic fatty acid composition according to the food ingredients. We can distinguish the type of plant-derived lipid by analyzing the fatty acid composition using gas chromatography.

DNA analysis, the fast-developing analysis in recent years, is widely used as effective analytical method in order to determine the species of ingredients. This analytical method is used to confirm the identification of species, especially tuna as follows:

- Extract DNA from muscles,
- Amplify the specific DNA to millions of copies using PCR (Polymerase Chain Reaction),
- Use restriction enzyme to digest the specific restriction sites,
- Confirm the digested DNA fragments using gel electrophoresis.

Because the mineral elemental composition in soil are difference in each area, there is a slight difference of the mineral compositions among the areas of the cultivated crops. If the much attention is paid to mineral composition in the crop by each area, it may be determined the geographic origin. Using Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) and Inductively coupled Plasma – Mass Spectrometry (ICP-MS), we determine elemental concentration and conduct statistical analysis to identify the geographic origin on onion and other crops.

Isotopes are variant atoms which have different mass numbers. Stable isotopes do not decay with time. The isotopic ratio found in natural environment varies according to photosynthetic types and environment. Analyzing stable isotope in food, we can identify whether the food labeling of ingredients is correct or not. Especially we are analyzing fruit drink and honey using stable isotope

analysis.

FAMIC is developing authentication methods for species identification and geographic origin in collaboration with other research institutes, and monitoring the food labeling using latest technology to ensure the consumer's reliability.