

Usefulness of strontium isotope composition for determining the geographical origin of Japanese horseradish (*Wasabia japonica*) (II)

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Originally, the use of strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) was restricted to geology and petrology, but they have been used as a particularly effective tracer of geographical food origin, as plants reflect the strontium isotope composition of the regionally based rock, soil, and water. Japanese horseradish (*Wasabia japonica*) is cultivated in springs and streams located at the top of rivers, where dissolved element and isotopic compositions would reflect the geological characteristics with the exception of effects of atmospheric deposition and human activity. This study aims to evaluate the usefulness of $^{87}\text{Sr}/^{86}\text{Sr}$ for determining the geographical origin of Japanese horseradish.

We collected 97 horseradish samples and 95 water samples from 34 locations of major production areas in Japan: Shizuoka, Iwate, Nagano, Tokyo, and Shimane. These samples were subjected to trace elements and $^{87}\text{Sr}/^{86}\text{Sr}$ analyses. The $^{87}\text{Sr}/^{86}\text{Sr}$ values differed, based on the geological characteristics of their site locations, and the value of horseradish sample was well accorded with that of water sample in the same location. The horseradishes collected from Izu and Fuji regions in Shizuoka, where young volcanic rocks such as Quaternary basalts are distributed, had low $^{87}\text{Sr}/^{86}\text{Sr}$ (below 0.7040), whereas those from Nagano and Tokyo, where older rocks such as Mesozoic granites and accretionary complex are distributed, showed higher ratios (over 0.7095). We conclude that $^{87}\text{Sr}/^{86}\text{Sr}$ value of the horseradish allowed us to distinguish the production area clearly.

Keywords: discrimination of the geographic origin, Japanese horseradish (*Wasabia japonica*), trace element, strontium isotopic ratio, Shizuoka Prefecture