

Investigating zinc isotopic variations among different types of plants

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In the last decade, stable isotope ratio analysis of zinc isotopes ($\delta^{66}\text{Zn}$) has gained popularity in various fields such as archaeology, medicine, and ecology. However, the natural isotopic variation of zinc in modern plants remains poorly understood. To address this knowledge gap, we present the largest dataset of $\delta^{66}\text{Zn}$ measurements in modern plants. Our dataset comprises 270 $\delta^{66}\text{Zn}$ results from 90 plant species, sampled from various locations across natural landscapes in France and from French supermarkets.

Our findings indicate that low chemical yields (< 100%) and incomplete digestion do not affect the reproducibility of the $\delta^{66}\text{Zn}$ results. Additionally, we found no significant differences between microwave and hot plate digestions. Interestingly, the range of $\delta^{66}\text{Zn}$ plant values was found to be larger than previously reported in the literature, with values ranging from -0.5‰ to 1.4‰. Importantly, we found no significant differences in $\delta^{66}\text{Zn}$ values between different categories of plants (fleshy fruits and nuts, fruit vegetable, legumes, bulbs, root vegetable, leafy vegetables). We also investigated isotopic fractionation between the flesh of fruits and their seeds or other parts of the plant, as well as isotopic fractionation within tuberous plants. Furthermore, we compared Zn isotope data with other dietary indicators used in archaeology (Sr/Ca and Ba/Ca).

Overall, our study provides important insights into the natural variation of $\delta^{66}\text{Zn}$ in modern plants, which can have implications for various fields such as food science, ecology, and archeology.