Trophic discrimination factor in $^{13}C/^{12}C$ for amino acids

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Nitrogen and carbon isotopic compositions of amino acids in organisms have widely been employed as a powerful tool to evaluate the resource utilization and trophic connection among organisms in diverse ecosystems. However, little is known about physiological factors for determining the isotopic discrimination (Δ) within amino acids of organisms. In this study, we therefore investigated the trophic discrimination of nitrogen and carbon isotopes within amino acids ($\Delta\delta^{15}N_{AA}$ and $\Delta\delta^{13}C_{AA}$, respectively) in four pairs of consumer-diet species.

The $\Delta\delta^{15}N_{AA}$ values in these combinations are consistent with those observed in many other combinations in previous studies. The $\Delta\delta^{15}N_{AA}$ values thus mirror the activity of amino acid deamination in consumers. In contrast, the trends in the $\Delta\delta^{13}C_{AA}$ suggest a different metabolic fate for the amino acid carbon isotope, and can be explained by the synthetic activity of amino acid *de novo* production in consumers. This results refine of our knowledge on the potential processes affecting the isotopic fractionation within diet and consumer compartments as well as environmental samples.

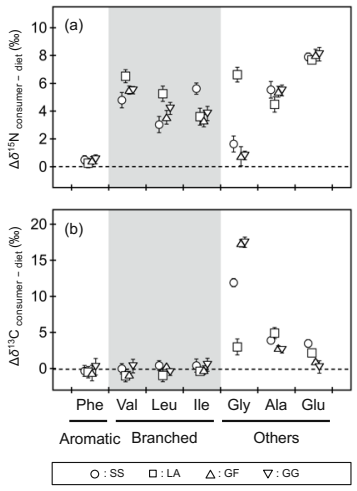

Fig.1. (a) $\Delta\delta^{15}N$ and (b) $\Delta\delta^{13}C$ values of amino acids in the consumer-diet combinations for sea slug feeds on sponge (SS), ladybug beetle feeds on aphid (LA), green lacewing feeds on fall armyworm (GF), and green lacewing feeds on green lacewing (GG). Error bar indicates standard deviation (1σ) of replicate measurements.