

COMPOUND SPECIFIC ISOTOPE ANALYSIS IN FOOD WEB STUDIES:  
THE NEED FOR ACCURATE ESTIMATES OF TROPHIC ENRICHMENT  
FACTORS

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## ABSTRACT

Ecosystem-based fisheries management strategies require knowledge of trophic relationships. Trophic position (TP) estimates from compound specific nitrogen isotopic analysis of amino acids (AA-CSIA), although promising, have not been thoroughly tested. TP estimates from AA-CSIA require knowing  $\beta$ , the difference in  $\delta^{15}\text{N}$  values between glutamic acid and phenylalanine in primary producers and  $\Delta$ , the  $^{15}\text{N}$  enrichment at each trophic step or trophic enrichment factor. Values of  $\beta$  (3.4‰) and  $\Delta$  (7.6‰) have been suggested for aquatic environments, however recent observations indicate that  $\Delta$  may be variable particularly among elasmobranchs. We determined  $\Delta$  values for three species of sharks, sand tiger (*Carcharias taurus*), lemon (*Negaprion brevirostris*), and leopard sharks (*Triakis semifasciata*), and one teleost species, opakapaka (*Pristipomoides filamentosus*) grown on semi-controlled and well characterized diets for durations ranging from three (*Triakis semifasciata*) to over five years (*Pristipomoides filamentosus*). We found the  $\Delta$  values for both elasmobranchs and opakapaka were similar and were significantly lower than the  $\Delta$  value of 7.6 ‰ previously reported. These results do not support the hypothesis that urea retention lowers  $\delta^{15}\text{N}$  enrichment values in elasmobranchs. Rather, similar  $\Delta$  values may be due to carnivorous feeding strategies in elasmobranchs and teleosts.