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**BULK AND COMPOUND-SPECIFIC ISOTOPE ANALYSIS OF TERRESTRIAL  
PLANT MATERIAL: HOW MANY SAMPLES ARE ENOUGH?**

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Both bulk and compound-specific  $\delta^{13}\text{C}$  stable isotope analysis are significant in the study of terrestrial ecosystems. Yet, sampling sizes are often assigned arbitrarily in the absence of quantitative studies on ecosystem sampling. We determined the  $\delta^{13}\text{C}$  value of bulk leaves and *n*-alkanes extracted from leaf waxes for >300 individual specimens representing three species of fern (Cibotiaceae, Marattiaceae, Thelypteridaceae) growing in a tropical rainforest environment on the island of Oahu, Hawaii. These data were used to establish a relationship for determining the sample sizes (*n*) required for achieving the ecosystem average  $\delta^{13}\text{C}$  value with a desired precision (at the 95% confidence level). Using this relationship we determined that a sample size of  $n \geq 8$  and  $n \geq 67$  was required to achieve precision better than  $\pm 1.0$  and  $0.2\%$ , respectively, for the ecosystem mean  $\delta^{13}\text{C}$  value. Data for  $\delta^{13}\text{C}$  of *n*-alkanes is currently being processed in preparation for presentation.