

FATTY ACIDS AND STABLE ISOTOPES IN ANTARCTIC
SPONGES: DIET ANALYSIS OF GUTLESS ANIMALS.

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CERTIFICATION OF APPROVAL

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ABSTRACT

The Antarctic has a diverse and conspicuous sponge community, but the diets of Antarctic sponges have not been quantified or described. This study used three techniques, fatty acid analysis, stable isotope concentrations, and a laboratory based feeding study, to address the diet of four species of Antarctic sponge: *Homaxinella balfourensis*, *Isodictya setifera*, *Kirkpatrickia variolosa*, and *Sphaerotylus antarcticus*. Sponges were sampled at distances between 115 and 840 m from the McMurdo station sewage outfall to provide potential diet variability. The sewage effluent acted as a tracer for particulates larger than bacteria. Sponge diet ranged from mostly bacteria, in the case of *I. setifera*, to mostly flagellates, for *H. balfourensis*. The diet of *K. variolosa* was intermediate between these two. The diet of *S. antarcticus* was not completely resolved by this study; fatty acid analysis supported its similarity to *K. variolosa* yet the isotopic analysis and feeding study separated it from the other sponges studied, suggesting that symbionts were abundant enough in this species to confound the results. This study is the first application of fatty acid analysis to determine diet composition of sponges, the first stable isotopic analysis of Antarctic sponges identified to species, and the first indication of differential utilization of microbial loop components by co-occurring sponges. The role of sponges as a conduit for microbial resources to the benthic metazoan food web is discussed.