11TH U.S. SYMPOSIUM ON HARMFUL ALGAE

FACTORS INFLUENCING CIGUATOXIN PREVALENCE AND DIVERSITY IN HIGHLY MOBILE APEX PREDATORY REEF FISH: A MANAGEMENT CHALLENGE FOR CIGUATERA POISONING

The identification of Caribbean ciguatoxins (C-CTXs) in fish vectors has been documented in reef fish from many areas of the Caribbean Sea and Western Atlantic, with outbreaks commonly reported from groupers, snappers, jacks, mackerel, and barracuda. Despite this, prediction and management of CTX in these mobile vectors remains a challenge due to the lack of integrated fisheries ecology and sustained and replicated cross regional data on the environmental and physiological factors that contribute to fish toxicity. Recently, we have been able to gain improved understanding of the causative algal toxin source and characterized new Caribbean CTXs and their metabolites in fish and gained insight on the in vivo kinetics of bioaccumulation and depuration in marine species. However, CTXs are present in trace amounts in contaminated fish matrices creating a continuing analytical challenge. In this study, we examined and tracked a variety of CTXs through the trophic web to higher predatory, highly mobile fish from the US Virgin Islands. Composite toxicity was quantified and species-specific toxin profiles of up to 10 C-CTXs (including multiple novel variants) were identified by LC-HRMS methods. Both toxicity, toxicity rank, and profiles were compared to size, age, sex, location, trophic position, and related stable isotope ratios as a proxy for diet. While relationships between size, age, and sex did not fully explain toxicity or toxin diversity in fish tissues, differences were identified between species and in offshore vs nearshore collected fish that were further evaluated using amino acid and lipid specific stable isotope analyses. Given the extensive impacts that ciguatera has in affected communities and the global reach of this public health issue, the synthesis of multiple data streams is long overdue and essential to effective risk management and development of predictive models.

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