MICROPLASTIC INGESTION IN HEALTHY AND BLEACHED CORALS
ANOMASTREA IRREGULARIS AND POCILLOPORA VERRUCOSA

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Corals are of great ecological and economical importance; however, they are increasingly threatened by human disturbances such as increasing sea surface temperature and microplastic pollution. Microplastics are of concern as they fall in the size range of corals’ natural food. Coral bleaching is a phenomenon where corals expel their endosymbiotic algae due to the stress of increased sea surface temperature. This has been increasing in frequency and severity which is causing major loss of coral cover globally, which extends to great loss in the goods and services they provide. Literature pertaining to the ingestion of microplastics and its effects on corals are scarce. Thus, this study aimed to determine if: (1) both healthy and bleached scleractinian corals ingested microplastics, (2) biofouling affected the ingestion rates (particles polyp\(^{-1}\) h\(^{-1}\)) of microplastics (beads and fibres), (3) ingestion of microplastics affected the respiration rate (mg O\(_2\) h\(^{-1}\) cm\(^{-2}\)) of corals. *Anomastrea irregularis* was chosen for use in the experiments as it is a common massive coral and *Pocillopora verrucosa* was chosen as it is a common branching coral on the South eastern coast of KwaZulu-Natal South Africa. This was done by conducting six separate 12-hour feeding experiments (zooplankton, microplastic (beads and fibres), biofouled microplastics (beads and fibres), as well as a mix (beads, fibres and zooplankton) in closed chambers using similar sized healthy and bleached *A. irregularis* and *P. verrucosa* nubbins. Two Generalized Linear Models (GLM) were done to determine if there were significant differences in the: 1) average ingestion rates of healthy and bleached *A. irregularis* and *P. verrucosa* when fed the different particles and 2) average respiration rates of healthy and bleached *A. irregularis* and *P. verrucosa* when fed the different particles. Both species when bleached and healthy ingested microplastics. The ingestion and respiration rates of both species fed microplastics (biofouled and non-biofouled) were similar to those fed zooplankton (when healthy and bleached) (GLM on ingestion rate: n=240, df=5, Wald Chi-Square=1.169, p=0.948; GLM on respiration rate: n=240, df=5, Wald Chi-Square=6.634 p=0.249). Ingestion and respiration rates of bleached corals were significantly higher than healthy corals for both species for all particle types (GLM on ingestion rate: n=240, df=1, Wald Chi-Square=49.383, p<0.0005; GLM on respiration rate: n=240, df=1, Wald Chi-Square=96.523 p<0.0005). Ingesting microplastics did not elicit any immediate stress responses by corals. It is possible that because corals have an incomplete gut and are adapted to egesting indigestible items, not many microplastics are retained in their gastric cavity or translocate to the endodermal cells. Thus, microplastics may easily be egested without much issue for corals. Results also show that corals that are more dependent on heterotrophy due to bleaching and morphology may be at greater risk of ingesting microplastics in situ. There is a need to understand how corals respond to microplastics in situ as these particles can have harmful substance adhered to them that can affect the corals’ overall health and reproductive output which could affect the whole coral reef ecosystem.