

The Distribution and Diversity of Diatoms with Relation to The Type of Microplastics in Sonmiani Bay Waters, Pakistan

Noor Us Saher, Muntaha Shah*

Centre of Excellence and Marine Biology (CEMB), University of Karachi

*E-mail: noorusaher@yahoo.com

ABSTRACT

Diatoms are unicellular or colonial photoautotrophic microalgae with a worldwide distribution range and most often observed as single cells, they can also form colonies, exist in suspension in the water column, or adhere to substrata. Diatoms comprise a large proportion of the phytoplankton in maritime and coastal waters. The purpose of this study was to examine the variety of diatom species found in Sonmiani waters, as well as the relationship and effects of microplastic concentration on these species.

Keywords: Diatoms, Environments, Phytoplankton, Microplastic

INTRODUCTION

Diatoms are photoautotrophic microalgae that are unicellular or colonial and size of cells fluctuate widely, from 5 μm to more than 1 mm in length or diameter (Sabater 2009). Although they can form colonies and live in suspension in the water column or adhering to substrata, they are most frequently seen as solitary cells. Diatoms can be found in a wide range of environments, including sea ice (Arrigo 2014) and deep marine sediments located well below the ocean's photic zone. In oceanic and coastal waters, diatoms make up a significant portion of the phytoplankton, and they frequently predominate over other species of microalgae or cyanobacteria (Armbrust 2009). Because of its endurance, plastic is used, produced, and found in many aspects of our environment today. It is estimated that 311 million plastics were produced worldwide in 2014. With the growing amount of microplastic, this is becoming a serious hazard to the marine ecology. Microplastic is defined as plastic that is 5 mm in size (Browne et al., 2008).

OBJECTIVE

This study was design to investigate the diversity of diatom species and to identify the relationship and impact of Microplastic concentration on these diatom species in Sonmiani waters.

MATERIAL METHOD

For this investigation, samples from Sonmiani Bay in Pakistan were collected between high and low tide during Jul 2021 to Jun 2022. Following their formalin preservation, all of the samples were brought into the lab. The variety of diatoms was assessed by microscopically examining two subsamples of the each samples. Additionally, samples were analysed for the detection and evaluation of microplastics by following Lima et. al., (2014) and Long et. al., (2015).

RESULT

The spatial and temporal variations were observed in the distribution of Diatom species. *Coscinodiscus centralis*, *Ceratium fusus*, *Navicula sp.* and *Chaetoceros sp.* were found in abundance, previous studies' findings show that the samples included notable concentrations of *Navicula*. The dispersion of microplastics

suggests that there is thread and bead contamination in the waters of Sonmiani Bay. Only a few diatom species showed a significant relationship with the amount of microplastics.

CONCLUSION

This study evaluated the impacts of microplastics on diatoms by examining the distribution of diatom species using cell density and microplastic abundance. This work could contribute to extend the knowledge of the harmful impacts of microplastics on diatoms.

REFERENCES

1. Lima, A. R. A., M. F. Costa, and M. Barletta. "Distribution patterns of microplastics within the plankton of a tropical estuary." *Environmental research* 132 (2014): 146-155.
2. Long, Marc, et al. "Interactions between microplastics and phytoplankton aggregates: impact on their respective fates." *Marine Chemistry* 175, 2015, 39-46.
3. Browne, Mark A., et al. "Ingested microscopic plastic translocates to the circulatory system of the mussel, *Mytilus edulis* (L.)." *Environmental science & technology* 42.13, 2008, 5026-5031.
4. Sabater, S. "The diatom cell and its taxonomical entity." *Plankton of Inland Waters* 149, 2010.
5. Armbrust, E. Virginia. "The life of diatoms in the world's oceans." *Nature* 459.7244, 2009, 185-192.
6. Arrigo, Kevin R. "Sea ice ecosystems." *Annual review of marine science* 6, 2014, 439-467.