SPATIAL AND SEASONAL VARIATION OF MICROPLASTICS IN THE SURFACE WATER OF PATENGA SEA BEACH, CHATTOGRAM, BANGLADESH

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Roll No. 0122/05

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A thesis submitted in the partial fulfillment of the requirements for the degree of Master of Science in Fisheries Resource Management

Department of Fisheries Resource Management

Faculty of Fisheries

Chattogram Veterinary and Animal Sciences University

Chattogram-4225, Bangladesh

JUNE 2023

Authorization

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JUNE 2023

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List of Abbreviations	
Acronym	**Definition**
T	Ton
Km^2	Square kilometer
$Particles/m^3$	Particles per meter cube
Items/g	Items per gram
m	Meter
cm	Centimeter
cm^2	Square centimeter
µm	Micrometer
ml	Milliliter
mm	Millimeter
M	Molar
g	Gram
l	Liter
g/cm^3	Gram per cm^3
m^2	Square meter
df	Degree of freedom
F	F-value
T	t- value
Sig.	Significance
Diff	Difference
SE	Standard error
e.g.	Exempli Gratia
ANOVA	Analysis of Variance

Abstract

The extensive non-degradable waste produced by the diverse use of many synthetic polymers, particularly plastics, led to the formation of microplastics (MPs) in the aquatic ecosystems. This current study narrated about spatial and seasonal variation in MPs quantity and features in the surface water at Patenga Sea Beach in Chattogram. Sampling was conducted from January 2022 to December 2022 seasonally by using 200 µm mesh size manta net. This study shows that Patenga beach (8.53 items/m^3) has the highest abundance of microplastics and Bay terminal (1.83 items/m^3) had the lowest abundance. The findings also revealed that there was a considerable variation among the season regarding the microplastics abundance. The abundance of MPs peaked in the spring (9.64 items/m^3) and greatly differ from the winter(1.98 item/m^3) and summer (2.18 items/m^3) season. Characteristics of microplastics (types, colors, shapes, size) were also quantified in this study. There were six different types of microplastics identified of which fragment (49.63%) and filament (40.44%) were dominant. The eight different group of color were examined of which transparent (40.40%) and red (24.50%) were most dominant. Among six shapes of microplastics irregular (52.63%) and elongated (37.17%) and among five size classes 300 µm to 500 µm (48.50%) were the most dominant. Thus, the current study light up the current distribution and abundance of microlastics in Patenga Sea Beach and provide very useful information to the stakeholder and responsible agencies for starting the mitigation efforts.

Keywords: Microplastics, Surface water, Patenga Sea Beach, Abundance