



IDENTIFICATION AND QUANTIFICATION OF MICROPLASTICS AT KALURGHAT OF KARNAPHULI RIVER

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Master of Science in Fisheries Resource Management**

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August 2022

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This is to certify that we have examined the above Master's thesis and have found that is complete and satisfactory in all respects, and that all revisions required by the thesis examination committee have been made

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LIST OF ABBREVIATIONS

Acronym	Definition
km ²	Kilometer square
Particles/m ³	Particles per meter cube
Items/g	Items per gram
M	Meter
Cm	Centimeter
cm ²	Centimeter square
µm	Micrometer
ml	Milliliter
Mm	Millimeter
M	Molar
G	Gram
L	Liter
g/cm ³	Gram per cm ³
m ²	Meter square
Df	Degrees of freedom
T	t- value
Sig.	Significance
Diff	Difference
SE	Standard error
e.g.	Exempli Gratia
ANOVA	Analysis of Variance

Abstract

Microplastics are pervasive and are thought to cause severe threat to the biodiversity of aquatic environments. Being one of the most densely populated nations in the world, Bangladesh is concerned about microplastic pollution both in marine and inland waterbodies. This study aimed to identify and quantify the microplastics along with their type, shape, color, and size analysis in the surface water of Karnaphuli river at Kalurghat, which point is dominated by industrial areas that probably produce microplastics. From July 2021 to February 2022, over 8-month period water samples were collected in a monthly basis from the Karnaphuli river near the Kalurghat bridge area. Samples were collected from 3 different portions of the river by using a 200 μm mesh size manta net. This study found six different types of microplastics in ten different colors, six different shapes, and five specific size ranges (0.005-5 mm) of microplastics. In this study, the NOAA method was used for the preparation of samples for analysis and observation. This experiment was based on visualization by naked eye and microscopic analysis. Microplastics were detected with the highest abundance during the month of July (47222 ± 9229 particles per km^2), the lowest availability in the month of January (22963 ± 3685 particles per km^2), mostly brown (18%) in color, and most particles ranging in size from 500 μm to 1 mm (31.58%). The most dominant microplastic in this study was filaments (35.89%), followed by film, fragment, foam, granule, and pellet, and they were mostly elongated (39.64%) in shape. This investigation provides acuteness on anthropogenic activities and basic microplastic pollution in the Kalurghat area of Karnaphuli river that will aid in developing effective conservations and management strategies to address such environmental problems.

Keywords: Microplastics, Karnaphuli river, Seasonal variation, Abundance