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Prevalence and Quantification of Microplastics in Fish Powders

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Ingestion of MPs by aquatic organisms possess serious threat for ecosystem as well as human health. Bangladesh has remarkable taxonomic fish diversity which comes with an equally habitat diversity. Many researchers confirmed the presence of microplastics in fish, shellfish, water and sediment of the country. Nevertheless, a comprehensive understanding of the contamination of microplastics across different fish body parts remains elusive.

This study conducted to analyze the presence, quantification, and morpho-chemical characteristics of microplastics in three types of fish powder: whole fish powder (WFP), fish muscle powder (FMP), and eviscerated fish powder (EFP) using SEM and FTIR spectroscopy. Chapila, Keski, Punti, Olua and Sardine were selected based on nutritional security, affordability, availability and commercial importance. Fish powders were produced in a traditional way by washing, sun drying, and grinding from the collected freshwater and marine water fish species.

Figure 1: Fish powder

A total of 157 MP items/g were found across all types of FPs, averaging 0.6

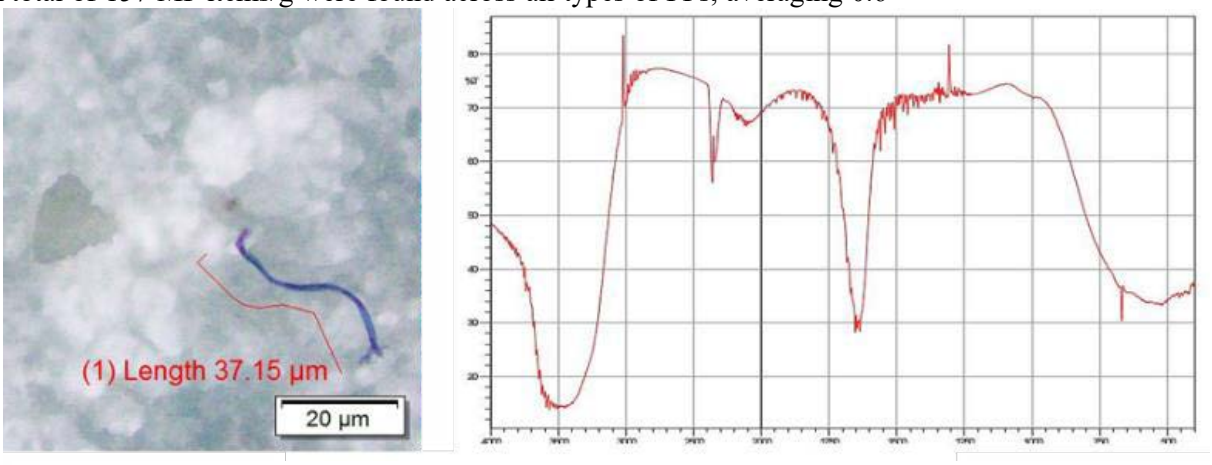

Figure 2: Microplastic confirmation

to 2.6 MP items/g. The highest occurrence was recorded in Sardine WFP 2.6 ± 1.13 items/g whereas, Keski WFP contained the lowest 0.8 ± 0.28 items/g. Microplastic abundance was consistently highest in the pattern WFP (50%) > FMP (29%) > EFP (21%), indicating the production of latter two types of FP have lower health risk. Majority (58%) of these MPs fell within the size range of 20-100 µm, with a maximum size of 291.9 µm across all FP samples. SEM analysis revealed surface cracks and roughness on the microplastics, while FTIR spectroscopy identified polyethylene (PE) and polypropylene (PP) as the predominant polymers. This study underscores the importance of proper processing such as evisceration and filleting can significantly contribute in reducing potential human exposure to microplastics.