UNIVERSITI TEKNOLOGI MARA

ASSESSMENT OF MICROPLASTIC ACCUMULATION IN COMMERCIAL PELAGIC FISHES, *SELAR CRUMENOPHTHALMUS* AND *DECAPTERUS MACARELLUS* FROM HUVADHU ATOLL, MALDIVES

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ABSTRACT

Microplastic pollution has become a pressing environmental concern, particularly in the Maldives, renowned for its stunning marine biodiversity and pristine beaches. As fishing is a significant industry and fish are a vital part of the local diet in these regions, microplastic pollution could have severe implications for marine life and human health. Therefore, this study aimed to investigate the presence of microplastics in the gut, gill, and flesh of two pelagic fish species, *Selar crumenophthalmus* and *Decapterus macarellus*, collected from two different locations in Huvadhu atoll, South Maldives. 100 fish were examined from the two pelagic species, and 532 possible microplastic pieces were identified through visual analysis. It was found that 74% of *Selar Crumenophthalmus* contained microplastics in one or more of the analyzed body tissues, while it was detected in 86% of Decapterus *Macarellus*. The abundance of microplastics in *Decapterus Macarellus* was relatively higher, with 6.78 ± 7.62 items per individual, compared to *Selar Crumenophthalmus*, with an abundance of 4.06 ± 4.89 items per individual. It was discovered that the abundance of microplastics in the guts of *Decapterus Macarellus* was the highest compared to other body parts, with an average abundance of 3.56 ± 4.68 items per individual. The ingested plastics mainly consisted of fragments (39.7%), fibres (44.7%), and films (15.6%). The particles included predominantly black (25.8%), blue (18.8%), and grey (17.9%), which were identified from the analysed gut, gill, and flesh samples. Other colours have also been noticed, but in smaller amounts. The ingested plastics were identified as polyethylene (PE), polypropylene (PP), and polyethylene terephthalate (PET), as determined using Fourier Transform-Infrared (FT-IR) Spectroscopy. These findings highlight the significant presence of microplastics in commercially important fish species in the Maldives, raising concerns about the potential transfer of these pollutants through the food chain and the associated health risks to both marine ecosystems and human consumers. Urgent action is needed to address the sources and impacts of microplastic pollution in the Maldives and other vulnerable coastal regions.

Keywords: microplastics, marine pollution, fish, ingestion, South Maldives

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CHAPTER ONE
INTRODUCTION

1.1 Research Background

Plastics are synthetic materials primarily made of carbon in long repeating chains of monomers. The monomers are base molecules that consist of various chemicals. Due to its ease of manufacture, flexibility, durability, and low cost, it has applications across several sectors. This development also released people from the constraints of natural resource shortages, and it went on to replace materials like steel, wood, and glass in various products.

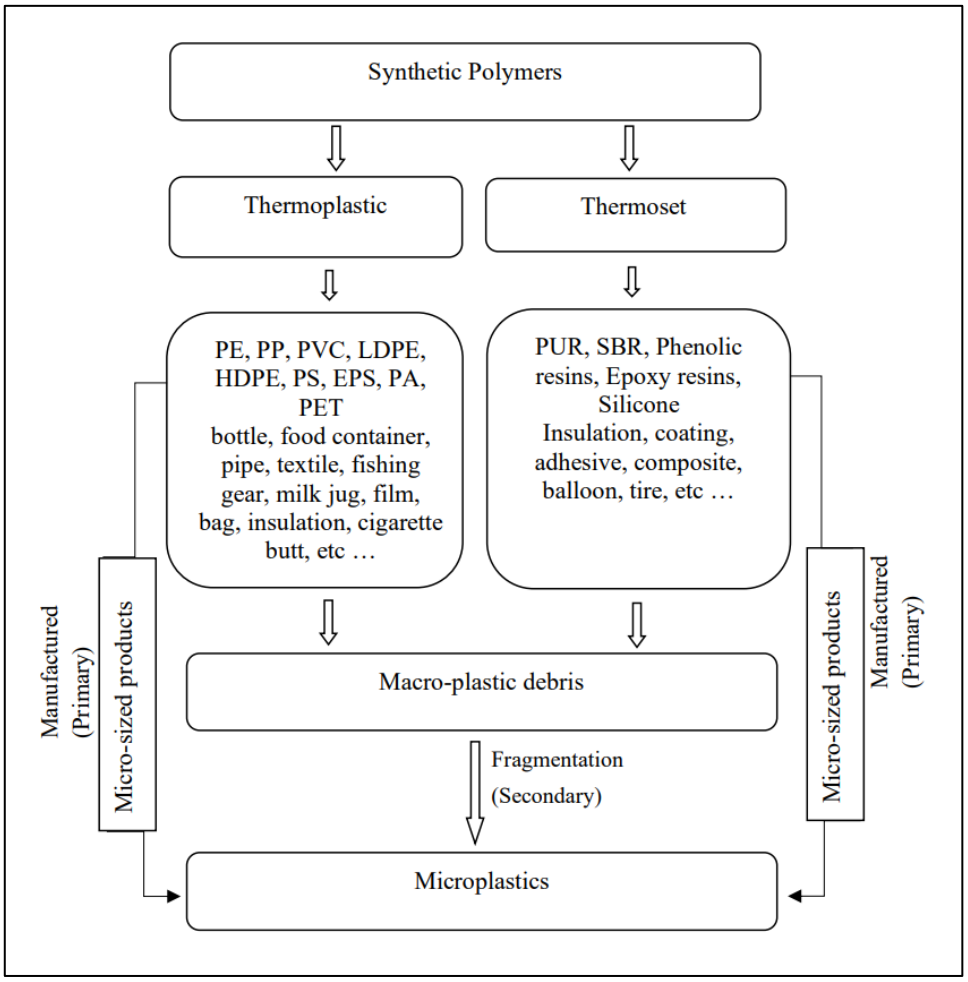

Figure 1.1 Global production includes a range of plastics of different composition and properties manufactured for particular usage (GESAMP, 2015)