



Analysis of Microplastic Abundance in Fish Landed from the Waters of South Leato Sea

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Abstract

Microplastics are plastic particles smaller than 5 mm, formed by the degradation of plastic materials in aquatic environments and potentially contaminating marine biota. This study aimed to investigate the presence of microplastics in fish caught. It landed in the waters of the South Leato Sea and to identify their physical characteristics and constituent polymer types. The research samples consisted of four fish species, namely skipjack tuna (*Katsuwonus pelamis*), scad (*Decapterus macrosoma*), debo (*Euthynnus affinis*), and oci (*Selaroides leptoleptis*), with the analyzed parts being the gastrointestinal tract and muscle tissue. Microplastic analysis was conducted using the National Oceanic and Atmospheric Administration (NOAA) method, which included Wet Peroxide Oxidation (WPO) for the degradation of organic matter, density separation for particle separation based on density, microscopic identification to determine the morphology and abundance of microplastics, and Fourier Transform Infrared (FTIR) spectroscopy analysis to identify the constituent polymer types. The results showed that the identified microplastics were categorized into three morphological forms: fibers, fragments, and films. Based on polymer analysis, the detected microplastics were predominantly composed of polyamide (nylon). The highest abundance was observed in gastrointestinal tract samples from oci and scad fish, at 0.6 particles per individual. In contrast, the lowest abundance was observed in skipjack tuna, at 0.2 particles per individual. These findings indicate variations in microplastic contamination levels among the fish species examined. This study provides important implications for understanding the extent of microplastic pollution in edible fish from the South Leato Sea and may serve as a scientific basis for environmental quality monitoring and mitigation efforts to reduce the risks of microplastic contamination in the food chain and human health.

Keywords: Fish; Fourier Transform Infrared Spectroscopy (FT-IR); microplastics

Introduction

Indonesia is widely known as a maritime country because the ocean surrounds its territory, and it has many rivers scattered throughout its territory. In addition, Indonesia is classified as a maritime country, given that its territorial sea area far exceeds its land area, with around 30% land and 70% ocean. As a maritime country, Indonesia has abundant marine resources, especially in the fisheries sector. As an archipelagic country with the largest number and area of islands in the world, the vast potential of the sea and the diversity of fisheries are expected to support improvements in community welfare, especially for fishermen (Damanik, 2025).

The abundant potential of marine resources requires sustainable management. One of the major issues threatening marine ecosystems is the presence of marine plastic debris, which consists of discarded materials originating from terrestrial and coastal environments and entering the ocean through river flows. This debris can be transported

to different locations due to the influence of ocean currents and wind, eventually accumulating in estuarine areas, coastal regions and certain marine waters (Tenriwaru et al., 2025). Plastic waste requires a prolonged period to undergo degradation in the environment. Microplastics are defined as plastic particles smaller than 5 mm that result from the degradation of larger plastic materials (Kusniati et al., 2025).

Microplastics can adsorb various hazardous pollutants, such as heavy metals and toxic organic compounds, which may subsequently accumulate along the food chain and enter aquatic organisms and humans, thereby posing potential health risks due to contaminant exposure that can cause both chemical and physical and biological effects (Arhafna et al., 2025). These microplastic particles can contaminate various ecosystems, especially aquatic and coastal environments. Its presence can adversely affect human health and marine organisms by adsorbing harmful substances, including heavy metals, pesticides, and pathogenic bacteria (Kusniati et al., 2025).

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Microplastics have the potential to contaminate various components of the environment, including water, sediment, soil, flora, fauna, and humans. Various types of microplastics commonly found in aquatic ecosystems include Polypropylene (PP), polystyrene (PS), polyethylene (PE), and polyethylene terephthalate (PET), which are the dominant microplastic group in the environment (Aryani et al., 2023). The chemical components in plastic can also accumulate in the bodies of aquatic organisms, so that if humans consume them, these organisms can transfer toxic substances into the human body (Tuhumury & Ritonga, 2020).

Microplastic pollution has a significant negative impact on aquatic ecosystems as well as causing serious damage to aquatic organisms, including fish (Hartini & Dewi, 2021). Microplastics accumulated in marine life can indirectly contaminate humans through the consumption of these organisms. Microplastic contamination in the human body can cause disorders in the digestive system, blood circulation, reproductive function, respiratory system, and various other physiological functions. This condition has a significant impact on the quality of fishery products and overall public health (Wirawan et al., 2021).

South Leato Village is one of the coastal areas located in Gorontalo City, precisely in the Tomini Bay area. Preliminary surveys indicate the presence of various types of waste along the coast of South Leato, suggesting waste pollution problems in the area. Data from the Gorontalo City Environment Agency in 2019 reported that the city generates approximately 138 tons of waste per day, with the main components being plastics, household waste, and food waste (Tangio et al., 2023). The geographical position of South Leato Village, which is directly adjacent to Tomini Bay, often leads the local community to use the bay's waters as garbage dumps.

To date, in-depth studies on microplastics in the Gorontalo region remain very limited. Several previous studies, such as Basalama et al. (2024), found that the total abundance of microplastics in Lake Limboto water reached 940 particles/m³ and in sediments, 2400 particles/kg. with microplastics found in water and sediments, which are types of fibers, films and fragments.

However, in-depth studies on microplastic contamination in marine biota, particularly fish caught by local fishermen in the waters of the South Leato Sea, remain relatively limited, despite the potentially high risk of pollution from the degradation of plastic waste into microplastic particles. The waters of the South Leato Sea were selected as the study area due to their status as a coastal region characterized by a high intensity of anthropogenic activities, including coastal settlement activities, marine transportation, fishing operations, seafood trade, and domestic waste disposal, all of which may contribute to increased

plastic pollution in the aquatic environment. The accumulation of plastic waste in coastal areas may undergo fragmentation induced by physical, chemical, and biological processes, resulting in microplastics that can be distributed throughout the water column and subsequently accumulate in aquatic organisms, including commercially consumed fish.

The selection of skipjack tuna (*Katsuwonus pelamis*), scad fish (*Decapterus macrosoma*), deho fish (*Euthynnus affinis*), and oci fish (*Selaroides leptoleptis*) as research objects was based on ecological, economic, and consumption relevance considerations, given that these four fish species represent pelagic fish groups that are commonly found, caught, and traded in the waters of Gorontalo, including the South Leato coastal area. In addition to their significant economic value to local fishing communities, these fish species are among the most frequently consumed fishery commodities, potentially serving as vectors for the transfer of microplastic contaminants to higher trophic levels, including humans. Variations in ecological characteristics among species, such as habitat preferences, migratory patterns, and feeding habits, are also presumed to influence the level of exposure, distribution, and accumulation of microplastics in each fish species. Therefore, the inclusion of multiple fish species in this study is expected to provide a more representative understanding of the characteristics, polymer types, and abundance of microplastics in marine biota inhabiting the South Leato Sea. Consequently, this study is important as an initial step toward providing scientific information on the status of microplastic contamination in fish caught by local fishermen, while also serving as a basis for developing aquatic environmental quality monitoring strategies and evaluating the potential risks of microplastic pollution to food safety and human health. Given this background, further studies on this issue are urgently needed.

Methods

This research was carried out within four months. The research sample was taken from the waters of the South Leato Sea. Furthermore, processing and testing of the fish will be carried out in the laboratory as part of the next stage of analysis.

Research tools and materials

Tools

The equipment used in this study included 25 mm diameter glass microfiber filter papers, dissection instruments, stationery, a cool box, a smartphone, a Global Positioning System (GPS), a graduated cylinder, a beaker, an aluminum tray, sample bottles, a spatula, an oven, a hot plate, a microscope, and Fourier Transform Infrared (FT-IR) spectroscopy equipment.

Materials

The materials used in this study consisted of fish samples, aluminum foil, distilled water, tissue paper, labeling paper, sodium chloride (NaCl), 30% hydrogen peroxide (H₂O₂), and a 0.05 M [Fe(II)] solution.

Sampling process

The fish samples used in this study were obtained by directly buying the catch of fishermen at the location of the sampling point that had been determined. The sample storage process involves placing fish in a tightly sealed aluminum foil container and then placing the container in a coolbox to maintain stable physical conditions. For preservation, the sample is stored in a freezer or refrigerator to maintain quality and prevent spoilage before further analysis is performed (Wirawan et al., 2021).

Fish sample identification

Species are then identified from fish samples obtained at the sampling site. The process of identifying fish species involves observing the morphological characteristics of each sample. The data from the morphological observations are then analyzed and compared with relevant scientific literature to ensure the accuracy of the fish-type determination (Raharjo, 2022).

Sample preparation

Following the method described by Wirawan et al. (2021), the sample preparation stage began by thawing the fish previously stored frozen, then removing them from the freezer and allowing them to reach room temperature. Once the samples were fully thawed, morphometric parameters, including length and mass of each fish, were measured. Fish length was measured with a ruler, and mass was determined with a digital balance. Subsequently, dissection was performed using a sterile scalpel to obtain the required sample parts. In this study, the analyzed portions of the fish included the digestive organs (viscera) and the fish meat.

Testing on the meat part was carried out by taking 20 grams of meat from each fish sample. Based on Raharjo's (2022) research on fish offal, the procedure involves placing the fish on a cutting board and carefully performing surgery with a scalpel. Fish offal is collected because if microplastics contaminate the aquatic ecosystem, these particles can enter fish bodies during feeding and accumulate in the digestive tract, especially in the intestines. The accumulation of significant amounts of microplastics can lead to blockages in fish digestive tracts. The offal and fish meat samples were then dried in an oven at 105 °C for 48 hours.

NOAA method sample testing

Sample testing using the National Oceanic and Atmospheric Administration (NOAA) method was conducted to identify the physical characteristics of microplastics in fish offal samples, including their number, shape, and color. The

NOAA method is carried out by including WPO, density separation, and microscope tests (Raharjo, 2022).

Wet peroxide oxidation (WPO)

The purpose of WPO is to separate the test solution into microplastic particles and organic deposits. The WPO solution is prepared for each sample by adding 0.05 M Fe(II) solution and 20 mL of 30% Hydrogen Peroxide solution. After that, it is heated and stirred at 75 °C and 120 rpm for 30 minutes. The sample is then drained, and saturated NaCl is added.

Density separation

The purpose of density separation is to separate organic deposits and microplastic particles, making microscopic examination easier. Density Separation is carried out by filtering using Glass Microfiber Filter Papers with a diameter of 25 mm until all the filtered solution is exhausted.

Microscope test

The microscope exam was carried out using a dissection-type microscope (Nikon SMZ445 46 Stereoscopic Microscope) with a twin-zoom objective optical system and a magnification of 10×.

Sample testing of the FT-IR method

Testing of microplastic chemical compounds in fish offal and fish meat samples was carried out using the FTIR (Fourier Transform Infrared Spectroscopy) method. The FTIR method is an analytical technique that identifies the characteristics of microplastics in samples using spectroscopic principles. The detection and analysis of the spectrum obtained from FTIR is carried out using infrared radiation processed through Fourier transformation. Infrared spectroscopy is used to analyze and identify organic compounds. In the process, infrared radiation is absorbed by various functional groups at uniquely specific frequencies. Furthermore, the light passing through the sample is transmitted, forming an infrared spectrum. The detector then records the intensity of the transmitted light. The infrared spectral data are then plotted as energy intensity versus wavelength (μm) or wavelength (cm⁻¹). The interpretation of the FTIR results was based on the degree of similarity of the highest polymer group score detected (Raharjo, 2022).

Data processing techniques

The analysis used is descriptive. Descriptive analysis is used for testing the physical and chemical characteristics of microplastics. The physical characteristics of microplastics in fish meat and offal samples include particle shape (fibers, foam, fragments, films, and granules) for classification and quantification. The following formula calculates the abundance of microplastics.

$$\text{Abundance} = \frac{\text{Number of microplastic particles (particles)}}{\text{Number of fish (individuals)}}$$

Analysis of the chemical characteristics of microplastics in the form of chemical groups contained in fish offal and fish meat samples using the FTIR test. The analytical data were then processed and described descriptively, including the characteristics of microplastics in terms of shapes, colors, and chemical groups, using graphs (Wirawan et al., 2021).

Results and Discussion

Identification of fish characteristics

The fish obtained from the sampling results include Oci Fish, Deho Fish, and Scad. A table identifying each fish used as a research sample is shown in **Table 1**.

Table 1. Identification of characteristics of fish

Fish Names	Image	Average length of fish (g)	Average fish weight (g)
Oci fish (<i>Selaroides leptoleptis</i>)		18.22 cm	99.81 g
Deho fish (<i>Euthynnus affinis</i>)		28.42 cm	367.61 g
Scad fish (<i>Decapterus macrosoma</i>)		24.33 cm	173.22 g
Skipjack (<i>Katsuwonus pelamis</i> .)		28.8 cm	440 128 g

Identification of microplastics based on the type of fish

Total abundance of macroplastics

Based on microscopic test results, the number of particles showing variation for each fish type studied was determined. In this study, the types of microplastics that were successfully identified included the form of fibers, fragments, and films. The difference in particle numbers is suspected to be influenced by various factors, including environmental conditions in the waters and the habitat characteristics of each fish species. In addition, these variations may be related to the lifestyle and eating habits of each type of fish. Further observations show that the number of microplastic particles per fish is detailed in **Table 2**.

Based on the observations, the number of microplastic particles found in each fish species shows a fairly clear difference. In this observation, microplastics are mostly found in fish offal, and none are found in fish meat samples. Larasati et al.

(2024) reported that the abundance of microplastics identified in muscle tissue (flesh) was relatively lower than that found in the digestive tract. This phenomenon is likely associated with the primary pathway of microplastic entry into organisms, which generally occurs via ingestion, leading to the initial accumulation of these particles in the digestive system.

Microplastic exposure in marine organisms is closely associated with habitat characteristics and the feeding behavior of species inhabiting specific aquatic environments. Skipjack tuna (*Katsuwonus pelamis*), scad fish (*Decapterus macrosoma*), deho fish (*Euthynnus affinis*), and oci fish (*Selaroides leptoleptis*) are classified as pelagic fish species. Consistent with the findings of Amin et al. (2023), pelagic fish generally inhabit open or offshore waters, which are more vulnerable to plastic pollution derived from anthropogenic activities and subsequently transported into marine environments. The feeding behavior of pelagic fish, characterized by active foraging within the water

column, further increases their susceptibility to microplastic ingestion, as these particles may become suspended and accumulate in surface layers and throughout the water column alongside natural food sources, such as plankton. From a chemical perspective, the elevated abundance of microplastics in aquatic environments is attributed to the persistent physicochemical properties of polymeric materials, which exhibit considerable

resistance to natural degradation, thereby enabling these particles to remain in the environment for extended periods. Furthermore, microplastic characteristics, including particle size, morphology, and polymer density, facilitate particle dispersion and accumulation throughout the water column, thereby increasing the likelihood of interaction with pelagic organisms.

Table 2. Number of microplastic particles in fish

Fish Names	Fish organs					
	Fiber	Fish offal fragmen	Film	Fiber	Fish meat fragmen	Film
Oci fish (<i>Selaroides leptoleptis</i>)	2	0	1	0	0	0
Scad fish (<i>Decapterus macروسoma</i>)	2	1	0	0	0	0
Deho fish (<i>Euthynnus affinis</i>)	1	1	0	0	0	0
Skipjack (<i>Katsuwonus pelamis</i>)	1	0	0	0	0	0

Based on the data presented in **Table 2**, microplastics found in fish innards differ by fish type. The highest number of microplastics, based on observation results, was found in samples of oci fish and Scad fish, with 3 particles each. Furthermore, in the deho fish, 2 microplastic particles were found in the offal. Meanwhile, the lowest number of microplastics was found in skipjack fish, at as few as 1 particle.

The results of this study show that the most abundant type of microplastic identified is fiber, followed by fragments, while the least abundant type is film-shaped microplastics. The number of microplastic types obtained in this study is presented in **Figure 1**. The difference in abundance between these types of microplastics indicates variation in pollutant-source contributions and in the physical characteristics of each particle, which further affect their abundance and distribution patterns in the study environment.

Fibers are a common form of microplastics generated by the degradation of monofilament materials, such as fishing nets, ropes, and synthetic textiles, and subsequently contribute to marine debris (Hafitri et al., 2022). The abundance of identified fiber-shaped microplastics is likely closely associated with various fishing activities in the area. Ropes used in fisheries, which are generally made of synthetic materials, are prone to gradual degradation

under environmental conditions, leading to their fragmentation into progressively smaller particles and contributing to the increasing presence of microplastics in aquatic environments (Yaqin et al., 2022).

Furthermore, fragment-type microplastics identified in the waters are suspected to come from the degradation of macro-sized plastic waste exposed to the environment. Sources of waste include items such as bottle caps, food packaging, and ready-to-eat food containers, which break down into small plastic particles that are then dispersed in the water. The existence of microplastic fragments is closely related to human activities using plastic products (Suryani et al., 2024).

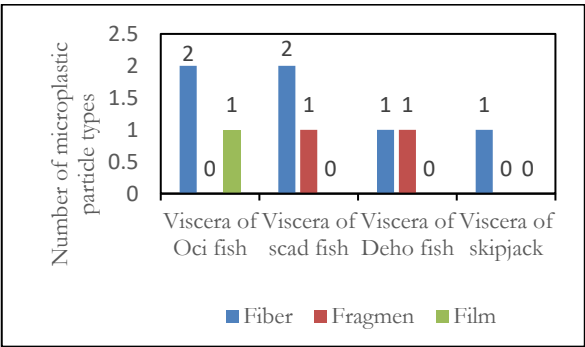


Figure 1. Total types of microplastics

Film-type microplastics exhibit the lowest abundance among the different microplastic types. Cahayani et al. (2024) reported that these microplastics are typically transparent, thin, sheet-like, and originate from the degradation of materials such as food packaging and plastic bags. Owing to their relatively lower density compared to other types of microplastics, they tend to float readily and accumulate in the surface layers of aquatic environments.

The predominance of fiber-type microplastics is associated with the high abundance of fibrous particles in aquatic environments and with fish biological characteristics related to food acquisition. The elevated abundance of fiber in aquatic ecosystems is presumed to be influenced by anthropogenic activities, particularly fisheries-related practices involving the use of nets, ropes, and fishing gear composed of synthetic polymers, which may undergo physical degradation due to ultraviolet radiation, mechanical abrasion, and oceanographic processes, thereby releasing microplastic fibers into the marine environment. Furthermore, the morphological characteristics of fibers, which resemble zooplankton, a natural food source for fish, increase the likelihood of ingestion during feeding, particularly in pelagic fish that actively forage within the water column, where suspended microplastics are widely distributed (Idris et al., 2024).

Based on observations of microplastic particle counts, the abundance of microplastic particles in each analyzed sample was determined. The abundance of microplastic particles in the fish sample indicates the number of microplastic particles contained in the sample. Thus, the abundance value obtained indicates the level of microplastic contamination in each fish sample per unit weight. The particle abundance in each sample is shown in **Figure 2**.

Based on the observation results, variations were found in the abundance of microplastic particles identified in the digestive organs of each fish sample. The highest abundance was observed in Oci fish and scad fish, with 3 particles detected in each sample and an average abundance of 0.6 particles per individual. Meanwhile, Deho fish contained 2 microplastic particles, with an abundance value of 0.4 particles per individual. The lowest abundance was observed in skipjack, with only 1 microplastic particle identified, yielding an average abundance of 0.2 particles per individual.

In this study, the number of particles and the abundance of microplastics identified in fish samples were relatively low compared with those reported in previous research. These findings show significant differences in microplastic contamination levels across locations and among

the types of organisms studied. For comparison, a study by Senduk et al. (2021) reported that in yellowstripe scad (*Selaroides leptolepis*), the average accumulation of microplastics was 10.1 particles in the gills and 8.4 particles in the digestive tract. Based on morphological characteristics, fiber was identified as the predominant type of microplastic, with 170 particles, followed by pellet (131 particles) and fragment (130 particles). At the same time, film was detected in the lowest quantity, accounting for only 13 particles. Meanwhile, Aryani et al.'s (2023) study found a total of 411 microplastic particles distributed in the gills, stomach, and intestines of the kitefish, with the highest dominance in the fragment type, especially in the intestinal part, as many as 173 particles, followed by gills and stomach, as well as a smaller amount of fiber and film types.

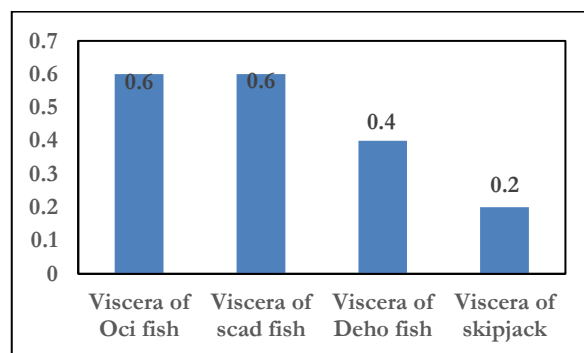


Figure 2. Abundance of microplastic particles in fish offal based on fish type

Several scientific studies indicate that microplastics can act as carriers of various organic pollutants into biological systems. Nevertheless, the toxicity of microplastics as individual particles has not yet been fully elucidated. From a food safety perspective, microplastics are classified as novel food contaminants due to their unintended presence and potential to compromise the purity and quality of food materials (Tuhumury & Ritonga, 2020).

Characteristics and identification of microplastics

Characteristics based on shape

Based on shape, microplastics can be classified into fibers, fragments, films, foam, and pellets (Kusniati et al., 2025). The results of microplastic identification in fish originating from the waters of the South Leato Sea show that microplastic particles found in the offal samples of each fish consist of several forms, namely fibers, fragments, and films. However, no microplastic particles of any kind were found in the fish meat samples. Thus, the observation results showed that microplastics were detected only in the offal, whereas no microplastics were identified in the fish

meat tissue. The types of microplastics by shape are shown in **Figure 3**.

Microplastics of the fiber type generally have a shape resembling fibers or long, rope-like threads. The main source of these microplastics is thought to be boat ropes, which are often in tidal regions, where the material is in constant contact with the surrounding surface. These mechanical interactions, influenced by wave and current dynamics, gradually degrade the rope material. As a result, these fibers

decompose into very small plastic particles that are then dispersed and accumulate in aquatic environments (Tuhumury & Ritonga, 2020). This finding is consistent with the study by Aryani et al. (2024), which indicates that fiber-type microplastics generally originate from activities in coastal communities predominantly engaged in fishing, where the use of various fishing gear made from synthetic ropes contributes to their generation.



Source : (Personal Documentation)



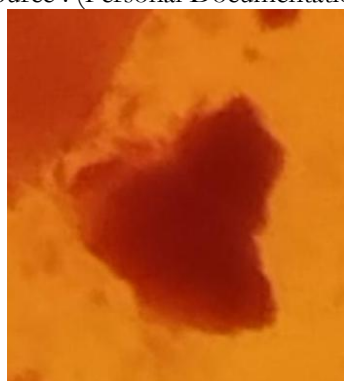
Source : (Suryani et al., 2024)



Source : (Personal Documentation)



Source : (Suryani et al., 2024)



Source : (Personal Documentation)



Source : (Suryani et al., 2024)

Figure 3. Microplastic forms found in fish offal samples (A) fiber, (B) film and (C) fragments

Microplastic fragments are small, irregularly shaped particles that result from the degradation of various plastic products, such as bottles, storage containers, plastic folders, and paralon pipe fragments. The presence of these fragments in waters is generally driven by the high accumulation of plastic waste in coastal areas, especially along coastlines heavily littered with domestic waste, such

as single-use plastic bottles and household plastic remnants (Susanto et al., 2023). Fragment-type microplastics are generally formed from the process of breaking and breaking rigid plastics composed of synthetic polymers with high durability. The existence of these particles in the aquatic environment is inseparable from the contribution of plastic waste generated by local community

activities. The number of fragments found is greatly influenced by the high levels of waste generated by domestic and tourism activities, such as single-use plastic bottles, mica packaging, and other products with a strong plastic structure. Over time, the material undergoes degradation, resulting in fragmentation and the formation of microparticles that are then dispersed in aquatic ecosystems (Azizah et al., 2020).

The third type of microplastic identified in this study is the film type. This type has morphological characteristics such as thin, generally transparent sheets and a relatively low density, so it tends to be easily dispersed in aquatic environments (Widiyanto et al., 2025). Yogi et al. (2024) also state that film-type microplastics are thin plastic sheets with relatively low density, so currents and waves easily carry these particles away in water. The prevalence of this type of microplastic is strongly influenced by people's habits of using single-use plastic bags and other plastic-based products. In general, microplastic films come from the degradation of plastic bags, packaging wrap, and similar materials, which are then broken down into micro-sized particles that are lower in density than other types of microplastics.

Characteristics based on constituent polymers

The polymer type of microplastics is determined using Fourier Transform Infrared Spectroscopy (FTIR), and the results are presented in a table. The infrared spectrum was interpreted by analyzing a representative functional group, confirming that the identified microplastics were polyamide (nylon) polymers.

Based on the FTIR spectral analysis in **Figure 4** and **Table 3**, the identified microplastic particles can be classified as nylon polymers. This is supported by the presence of characteristic absorption bands in the wavenumber range of $3400 - 3300 \text{ cm}^{-1}$, indicating N–H stretching vibrations, as well as bands in the range of $1620 - 1680 \text{ cm}^{-1}$ associated with vibrational modes, including contributions from C=C stretching and N–H bending. The presence of these N–H functional groups is a key characteristic of polyamide (nylon) structures, thereby confirming that the detected microplastics are composed of this polymer (Suprijanto et al., 2021).

Hanif et al. (2021) also stated that polyamide, also known as Nylon, can be sourced from fishery activities and domestic waste. These materials generally come from fishing gear, such as synthetic nets and fishing lines, as well as from textile fibers detached from clothing and carried into the marine environment through waste streams.

Nylon polymers characterized by the presence of stretch N–H functional groups are

thought to originate from various anthropogenic activities in aquatic environments. One of the most likely sources is fishing equipment, such as nets and fishing lines, which are generally made of polyamide. In addition, these polymers may originate from textile waste, including clothing fibers and synthetic yarns, that enters coastal waters via domestic waste disposal. These conditions indicate that fishery activities and household waste around the habitats of the two samples may contribute to the presence of nylon-based microplastics in the marine environment (Suprijanto et al., 2021).

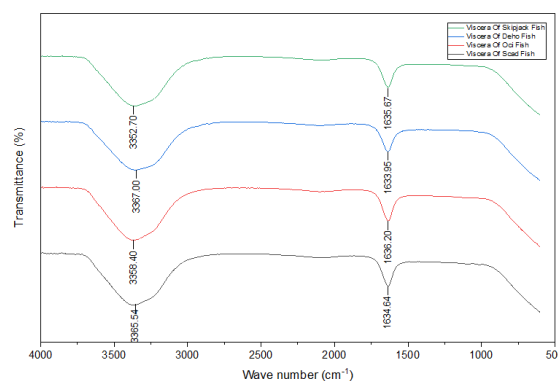


Figure 4. Infrared Fourier transform spectrum in samples

Table 3. Analysis of the FT-IR test on samples Suprijanto et al. (2021)

Sample name	Number of wavelengths of FT-IR analysis results (cm^{-1})	Compound bonds
Skipjack innards	3352.6952	N-H stretch
	1635.6723	C=O Stretch NH bend
Deho innards	3367.0038	N-H stretch
	1633.9522	C=O Stretch NH bend
Oci innards	3358.3989	N-H stretch
	1636.204	C=O Stretch NH bend
Scad innards	3365.5451	N-H stretch
	1634.6372	C=O Stretch NH bend

In line with this, research by Dewi et al. (2025) states that nylon polymer is widely used in various products, such as textile materials in clothing, rigging, and household components such as toothbrush bristles. This wide use is supported by the characteristics of nylon, which is flexible, lightweight, and elastic. It has good chemical stability, with a relatively low monomer residue content, so this material is often used for these products.

Conclusions

The results of the study showed that microplastics were identified in samples of caught fish landed in the waters of the South Leato Sea. These microplastic particles are found only in the offal organs, and no contamination is detected in the fish meat. The types of microplastics successfully identified include fibers, fragments, and films, which exhibit variations in particle shape depending on their physical characteristics. In addition, the identification results using FTIR analysis showed that Nylon polymers dominated the type of polymer that makes up microplastics found in this study

Conflict of Interest

The authors declare that there is no conflict of interest related to the publication of this article.

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