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The cycle of decline in ocean health: micro plastics, an emerging problem

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Abstract: Studies show that more than 80% of the garbage found in the oceans is formed by plastics, most of this recyclable is located in surface waters with 95%, then we have to the coast with approximately 83% of all this material, and finally we have the river beds that have the lowest percentage, with an estimated 49%, despite being the lowest percentage, it is stillrelevant. The aim of this research is to present and raise awareness among the community about the importance of preserving the health of the oceans and other species found in our seas. This is a bibliographic review study, that is, a survey of theoretical framework from scientific publications, which is carried out in the databases of SciELO and Latin American and Caribbean Literature on Health Sciences (Lilacs). It was noted that it is of fundamental importance the need for the development of studies and/or research directed to the toxicological effects that MPs can cause to aquatic biota and for human health as well.

Keywords: Marine debris; Marine pollution; Micro plastics.

1. Introduction

It is not today that plastics are suffocating marine life, this dangerous residue has been accumulating in the oceans over the years and bringing enormous damage to all marine fauna. Studies show that more than 80% of the garbage found in the oceans is formed by plastics, most of this recyclable is located in surface waters with 95%, then we have to the coast with approximately 83% of all this material, and finally we have the river beds that have the lowest percentage, with an estimated 49%, despite being the lowest percentage, it is still relevante. The identification that plastics are stifling marine life, they see being shared over the years, this dangerous waste accumulating in the oceans over time, offers a gigantic damage to the entire ecosystem (MACHADO, *et al*,2017).

Ruf (2021) states that since the 1950s, plastic production has grown exponentially and reaches an incredible mark of 359 million metric tons in 2018, so much of all this manufacturing ends up in open and uncontrolled landfills, river drainage zones and then oceans arrive.

According to studies conducted by NOAA (2021), plastic residues are found of different sizes and shapes, but those that are less than five millimeters long are called micro plastics (MPs), which can arise in different sources. Desde larger pieces that are degrading up to resin granules used in the manufacture of plastic or else in the form of microspheres.

In a way, the pollution of the oceans caused by these fragments is seriously worrisome due to their durability and ubiquity, as well as their intoxication content. Dispersion and accumulation are a growing problem on a global scale, and consequently affects all marine environments (SOBRAL, FRIAS, MARTINS, 2011).

For this purpose, the S MPs can be classified as primary and secondary. The primary MPs are those manufactured on a micro scale and are mainly used in facial cleaning products and cosmetics, in turn the secondary ones are small plastic fragments resulting from the breaking of larger plastics in aquatic and terrestrial environments (SILVA *et al*,2021).

The distribution of MPs in the marine environment will be due to several factors, the most relevant is the proximity of polluting sources, it is interesting to point out that in aquatic ecosystems, low density MPs are found more easily on the surface of water due to their high rate of buoyancy, while high density sources are found in the depths (OLIVATTO, G.P *et al*, 2018).

As these residues enter the oceans, marine fauna is affected, green turtles (Cheloniamydas), for example, ingest this material by accident by confusing it with food, doing so their digestive system is obstructed thus causing their death (MACHADO, *et al*,2017).

It is known that MPs have the ability to siw contaminants on theirsurface, once ingested by a certain species the contaminant can reach other trophic levels of the food chain, thus causing a cascading effect and affecting numerous species, including humans (LIMA, BERTOLDI, 2019).

Considering the various studies that demonstrate and affirm the relationship of anthropic determinants under the dynamics of the risk that plastic and MPs can offer to the oceans and in all marinefauna, it is relevant to develop a critical review of the literature, in order to present and raise awareness the community about the importance of preserving the health of the oceans and other species found in our seas.

2. Methodology

This is a bibliographic review study, that is, a survey of theoretical framework from scientific publications, which is carried out in the databases of SciELO and Latin American and Caribbean Literature on Health Sciences (Lilacs) (GIL, 2018). The research was conducted between June and September 2021, according to the inclusion criteria: works in English and Portuguese, published in the last five years, which deal with topics related to the awareness of the population of the risk that plastic and micro plastics can cause to the oceans and in all marine fauna. Only articles available for free online were included. Exclusion criteria include: works whose text is not available in full, duplicated, revised, meta-analysis, and also works that, after reading, did not present a relationship with the research objective.

The descriptors: "Detritus" was applied as a research strategy; " Marine pollution"; "Micro plastics "in both databases.

The selection of the published were carried out according to Figures 1 and 2.

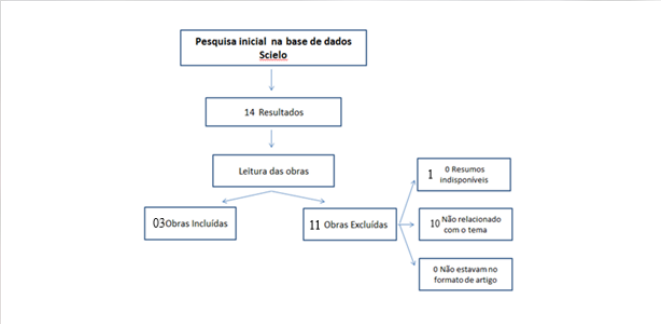

Figure 1. Selection in the SciELO database. Source: Search data

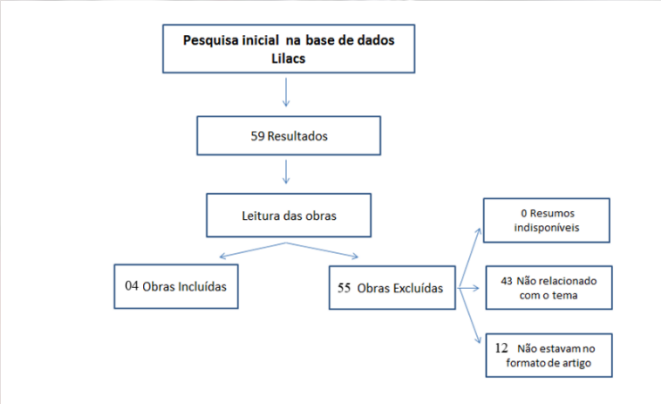

Figure 2. Selection in lilacs database. Source: Search data

3. Results and Discussion

Regarding the results found, a total of 73 works were analyzed, but only 07 works were included in the research.

Table 1. Research strategies used and results found in the database in number

Databases	Strategy	Number of Results Found
SciELO	Marine débris	0 works
	Marine pollution	12 works
	Micro plastics	02 works
Lilacs	Marine débris	08 works
	Marine pollution	31 works
	Micro plastics	20 works

Source: Search data.

Table 2. Statement of the studies that make up the Integrative Review

N	Date	Title	Authors	Journals	Goals	Findings
1	**2021**	The ocean is full of tiny plastic particles, we found a way to track them with satellites.	Christopher Ruf	Magazine: The conversation.	Evidence the small plastic particles that are found through satellite tracking.	It was found that micro plastic pollution is increasingly affecting the ocean, which are used plankton cone-shaped networks to better remove the garbage particles that are found.
2	**2021**	Environmental contaminants: effects of microplastics on aquatic and terrestrial organisms.	SILVA, D.C, *et al.*	Research, Society and Development	The present work aims to perform a literary overview focused on environmental impacts, evidencing the effects of MPs on aquatic and terrestrial organisms.	It was observed that plastic micros negatively negatively and/or indirectly affect aquatic and terrestrial organisms, with ingestion being the main pathway of biotic contamination.
3	**2019**	Evaluation of the interaction between polyethylene and polystyrene plastic microsagainst different endocrine disrupting compounds	Lima, F.A; Bertoldi, C.F	UFRGS Exhibition 2019: Technological Innovation Fair at UFRGS - FINOVA, 2019	Define that plastics have a wide range of applications in various manufacturingsectorssuch as the food and cosmetic industries.	It was verified that the systematic study was carried out analyzing the mechanisms of sorption in different mpsdosages, kinetics and concentrations of EDC.
4	**2019**	How to write a literature review article.	Goncing, J. R	JRG Journal of Academic Studies	Define assist the preparation of a literature review article.	It was found that the literature review has its configuration with both one of the types of course completion work, besides being one of the most common types.
5	**2018**	Microplastics: Contaminants of Global Concern in the Anthropocene	Olivatto, G. P, *et al.*	Virtual Chemistry Magazine	Evidence contaminants and polymers that are matandriais constitutedby macromolecules and chemical structures of a high molecular weight.	It was found that the studies are thermoplastic scans are considered a subcategory of the class of synthetic organic polymers and are easily manufactured, as they are passive to be

						molded when they are submitted .
6	**2011**	Micro plastics in the oceans - an endless proble m in sight	Paula Sobral; João Frias and Joana Martins	Ecology Magazine	Evidence that MPs most often result from particles of larger dimensions that undergo persistent photochemica l degradation and abrasion.	It was observed that the choice of this theme has increased especially after the discovery of a very extensive plastic stain accumulat ed in the North Pacific Ocean Gyre that came to draw attention.
7	**2017**	Microp lastics as an andmer ging threat to terrestr ial ecosyst ems	Machado, *et al*.	Wiley Global Change Biology	This article presents widespread micro plastic contamination as a potential agentforglobal change in terrestrial systems, highlights the physical and chemical nature of the respective observed effectsand discusses the broad toxicity of nano plastics derived from plastic degradation.	We suggest that the presence of MPs is ubiquitou s in terrestrial environm ents, with potential conseque nces for biodiversi ty, as well as for human health and the ecosyste m. This highlights that research is urgently needed to clarify the environm ental fate and effects of these small plastic particles on terrestrial systems.

In addition, it was observed that the papers dealing with the subject were scientific articles. Finally, in the following sections we have the main points that the authors consulted discuss about the cycle of decline in ocean health and the impacts that mps cause on aquatic biota.

The definition offered by Olivatto *et al*, (2018), presents the MPs as a grouping of polymeric synthetic materials of < 5mm. These are a potential geological indicator in the Anthropocene.

In addition, MP's can be confused with food due to their size. These undergo photochemical degradation and abrasion, and can permeate the suspended surface or deposited at the bottom of the oceans. The ingestion of these clusters of synthetic polymeric materials constitutes a threat to macros and microorganisms, causing not only mechanical obstruction of the digestive system, but also reaching other body areas and/or vital organs (SOBRAL, FRIAS, MARTINS, 2011).

The interaction of MPs with organisms can be accompanied by the process of ingestion of scattered debris in water. Interaction pathways in terrestrial animals can also be recorded, from the inhalation of micro pollutants contained in contaminated soils. (SILVA *et al*,2021).

In relation to the interaction of MPs with other contaminants, it becomes possible. Thus, it originates vectors that will directly contribute to the transport of these synthetic materials in natural waters, offering harmful effects to the aquatic environment (LIMA, BERTOLDI, 2019).

4. Conclusions

From this research, it was observed that research directed to the toxicological effects of plastic micros (MPs) on freshwater and marine water bodies are still limited.

Moreover, the presence of MPs in these media has drawn the attention of environmental researchers about the consequences that these microparticles can cause to aquatic biota.

It was noted that it is of fundamental importance the need for the development of studies and/or research directed to the toxicological effects that MPs can cause to the aquatic biota and for human health as well.

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