



## ASPECTS OF HIGHLY MICROPLASTIC CONTAMINATION IN THE ATLANTIC FOREST ESTUARY

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The Atlantic Forest is one of the richest regions in terms of biodiversity in the world. Originally the biome covered about 15% of the national territory. Currently, only about 12.4% (SOS MATA ATLÂNTICA, 2021) of well-preserved forest remnants remain in the country [1]. Regarding mangrove areas, in the state of São Paulo there are about 223 km<sup>2</sup>, according to the Atlas of mangroves in Brazil, with about 120.5 km<sup>2</sup> of this total in Baixada Santista. Analyses of sediments collected at Santos estuarine mangroves, in various points show a high concentration of microplastics generated from industrial processes or even anthropogenic activity. These solid particles based on (< 5 mm) are today one of the main environmental problems. The microplastics present in the sediment samples were quantified after drying and sieving amount limited of sediment. FTIR and micro-Raman spectroscopy identified filaments and fragments of microplastics (MPs) as common polymer spectra. Also additives and herbicides were present in some MPs. All polymeric types identified (<5mm) have wide applications and demands by packaging, civil construction, automotive, electrical and electronics, and textile sectors.

**Keywords :** *microplastic, sediment, Santos estuary, micro-Raman, polymer*

**Fundings:** CAPES, FAPESP

### Introduction

The SESS is located in the Santos basin in a sedimentary area that extends over approximately 352 thousand km<sup>2</sup>, covering the northern portion of the coast of the state of Santa Catarina, the southern portion of the state of Rio de Janeiro, and the entire coast of Paraná and São Paulo [2]. In addition to the characteristic and dynamic conditions of the estuary, settlements of irregular dwellings lacking a basic sanitation system are present in that coastal region.

Nowadays the estuaries of the world are considered important for filtering microplastics from the coastal water avoiding the ocean integration of contamination.

In addition to the presence of the Port of Santos and the Petrochemical Complex of Cubatão, the estuarine channels and rivers of the SEES are directly influenced by the tidal regime, in addition to harboring an important mangrove ecosystem, considered a permanent preservation area strongly impacted by human activities. Irregular occupation [3] and the presence of sanitary landfills and municipal dumps weaken the environment [4-6]. Considering that one branch of Billings, the cleanest and least contaminated, goes to Santos. There is no way that the pollution comes from reservoirs of the plateau to the estuary of the SEES. However, hydrodynamic dispersion associated with high and low tides may well explain this high contamination of the Santos-São Vicente estuary

other the anthropogenic influence in the local of high population density, in the interior of the estuary.

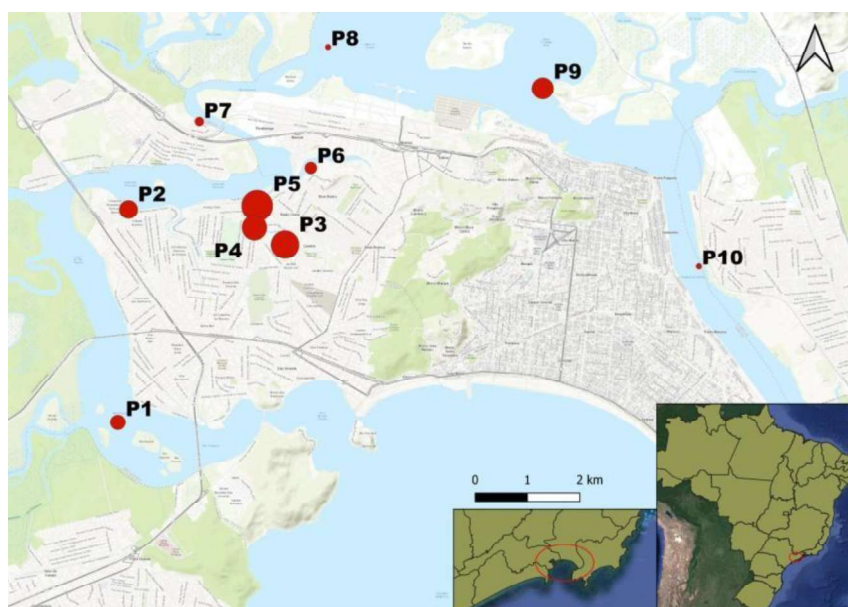
The present study of microplastic contamination in the Santos estuary is focused on a detailed investigation given its importance for the conservation of human health and local biota.

## Experimental

The sediment mangrove samples were collected in Van Veendrag at total of 8kg in each site. The total of eleven sites were collected and This procedure involves sediment collection, drying, sieving (2.0, 1.0, 0.5 and 0.25 mm mesh sizes), and examination of the samples retained in each sieve. The results of particles per gram of sediment was considered as the microplastic abundance. This method by Gimiliani et al.(2020) described at <http://dx.doi.org/10.1016/j.cscee.2020.100020> estimates the total microplastic abundance and distribution [6].

## Results and Discussion

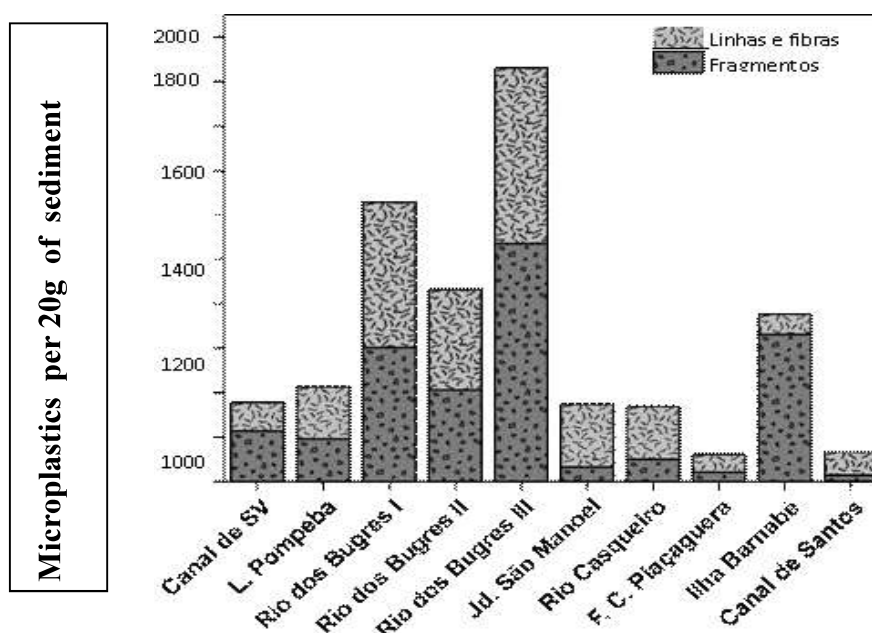
The Fig 1 shows the site of collected samples. The area of higher density of microplastic was the Rio dos Bugres where the abundance of microplastics varied from 43000-93000 particles per kg of sediment.



**Figure 1-** Illustration of microplastics abundance in the estuary of Santos.

The higher density of microplastics, Fig 1, is shown in the Rio dos Bugres where the community of Duque grows. But it was clear that not only the anthropogenic effects defined the environmental pollution of that local. The transportation of microplastics depends greatly of the hydrodynamic of the estuary [8].

In terms of morphology of the particles, the abundancy of fragments and fibers or lines, as observed by microscopy, is represented in Fig 2.



**Figure 2-** Ocorrence of fragments, and fibers/ lines per 20g of sediments for each site investigated.

## Conclusions

This study verified the ubiquity of microplastics in the matrices evaluated and found microplastics to be present at levels that create potential risks for humans and the environment. The data on the composition, characteristics, and distribution of microplastics presented herein may be used in future research or environmental monitoring and food safety assessment programs.

## Acknowledgements

The authors thank to CNEN for project support and grants Edital 6: n° and for IPEN/CLA for micro-Raman analysis.

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