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Diagnosis of the Presence of Plastic Pellets on Beaches in the Bay of All Saints/Bahia

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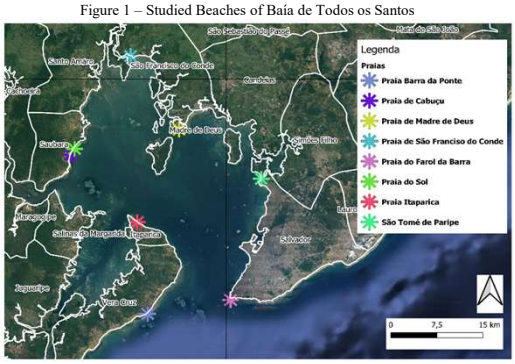
INTRODUCTION & AIM

The emergence of synthetic substances is directly linked to the development of society and technology, which can result in environmental issues (QUEIROZ, 2022). Currently, we can highlight the pollution caused by plastic pellets, which may be released into the environment during manufacturing, transportation, or as a result of accidental spills during maritime and land transport (FERRARI et al., 2024). Plastic pellets are used in various industrial activities, serving as a raw material for the production of diverse types of plastics and even cosmetics utilized by society. Presently, most urban beaches around the world exhibit plastic pellets (http://www.pelletwatch.org/).

This study aimed to develop a preliminary assessment of the presence and dispersion of plastic pellets on the beaches of Baía de Todos os Santos (BTS). For this purpose, the following beaches were studied: Farol da Barra, Cabuçu, Praia do Sol, Praia da Costa, Barra Grande, Itaparica, São Tomé de Paripe, and São Francisco do Conde.(Fig. 1).

Figure 1 – Studied Beaches of Baía de Todos os Santos



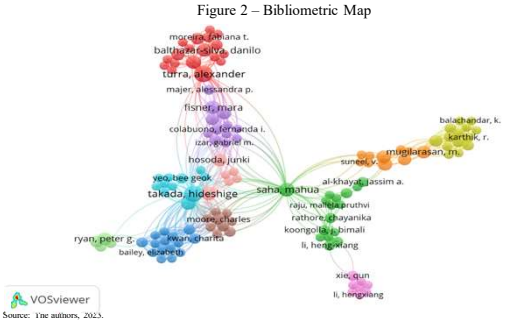
Source: The authors, 2023.Fonte:

METHOD

The methodological steps are summarized as follows:

- Literature Review:Digital platforms (Scopus and Web of Science);
- The search terms used were: "beach," "plastic pellets," and "plastic pellets sources.“
- A total of 493 articles were selected, highlighting the main authors working with these search terms, which generated the bibliometric map in VOSviewer.(Fig. 2)

Figure 2 – Bibliometric Map



Source: The authors, 2023.

2- Data Collection using Software;

3- Fieldwork focused on identifying the presence and distribution of pellets on the beaches, conducted in 2023.

- A total of 75 beach profiles were marked across 8 beaches in Baía de Todos os Santos (Fig. 1).
- The sampling points corresponded to the post-beach zone and the intertidal area (at the high tide line THOMPSON et al., 2004; BESLEY et al., 2017), and potential sources of pellet emissions were also considered.
- For the present study, the adopted methodology involved placing a square with dimensions of 1 x 1 m to organize the investigated areas (a measuring tape was used to mark the square)(Fig. 3 A e B).

Figures 3 A and B – Sample Collection

(A) Square placed on the sand for sediment collection / (B) Collected pellet sample
Source: Personal collection, 2023

RESULTS & DISCUSSION

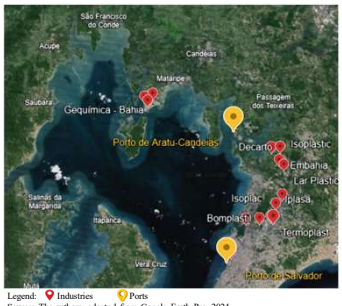
During the fieldwork, a significant presence of pellets was observed on the studied beaches.

The high frequency of these granules in coastal areas, according to Falcão (2015), may be associated with hydrodynamic transport mechanisms (winds, tides, waves).

However, their spatial distribution along the beaches may be linked to two factors: the morphodynamics of the beach and meteorological tides, such as storm surges (FALCÃO, 2015).

Based on these findings and considering the observations made in the field, particularly the specificities of the visited beaches, the meteorological and morphodynamic conditions, and especially focusing on the superficial distribution of the plastic granules, it appears that the areas of highest concentration on the beaches of Baía de Todos os Santos are associated with the presence and proximity of potential emission sources, such as port systems, logistics, and plastic industries (e.g. MANZANO, 2009; ANDRADE NETO, 2014; PEREIRA, 2014; FALCÃO, 2015; ALVES et al., 2018; CORCORAN et al., 2020) (Fig.4)

Figure 4 – Main Ports and Plastic Industries of Baía de Todos os Santos



Source: The authors, adapted from Google Earth Pro, 2024

CONCLUSION

Based on the observations made in the field within the study area, it was found that the beaches with the highest concentrations of pellets are located near emission sources, such as the ports of Salvador and Aratu-Candeias, as well as plastic production industries. There are several other sources present, including vessels, oil platforms, and petrochemical facilities (TURRA, 2008); however, these will be studied at a later time.

THANKS

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FUTURE WORK / REFERENCES

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