

# MONITORING OF MESO AND MICROPLASTIC DEBRIS IN PLAYA GRANDE BEACH (TENERIFE, CANARY ISLANDS, SPAIN) DURING A MOON CYCLE

## INTRODUCTION

Microplastics abundance in the coastal zones varies not only over space but also over time. As a result, the sampling period and the spatial distribution are of special concern. Concerning the periodicity of the sampling, many studies frequently develop a single sampling while others develop a long-term evaluation, in many cases once a month. In order to accomplish this, it is important to know how the abundance of microplastics varies on small temporal scales, which can also differ from one place to another, as a result of the local variation in hydrological processes; of particular interest is also the monitoring during a moon cycle, in order to study the possible influence of the tides on microplastics arrival. To the best of our knowledge, microplastics monitoring during a complete moon cycle has only been developed in two occasions<sup>1,2</sup>, in the first case in different parts of an estuary and, in the second, in different parts of a sandy beach (water sampling).

In this work, the occurrence and composition of meso- (5-25 mm) and microplastics (1-5 mm) in Playa Grande beach (Tenerife, Canary Islands, Spain) was monitored during a complete moon cycle on the different moon phases between 17<sup>th</sup> June and 16<sup>th</sup> July 2019. A total of 10 points were sampled each day finding an average content of mesoplastics of 18 g/m<sup>2</sup> (0.36 g/L) and of microplastics of 78 g/m<sup>2</sup> (1277 items/m<sup>2</sup> or 1.6 g/L). Polypropylene (PP) and polyethylene (PE) were the most abundant types of plastics. Among the analysed particles, fragments accounted for 83 % of the total. The obtained results revealed that microplastics presence could not be related in this case with the tides but with the orientation and strength of the wind.

## EXPERIMENTAL

### SAMPLED BEACHES

Table 1. Data of the sampled beach and sampling days.

Beach name	Playa Grande
Municipality	Arico
Sampling date	06/17/19 (full Moon); 06/26/19 (third quarter); 07/01/19 (new Moon); 07/09/19 (first quarter); 07/16/19 (full Moon)
Coordinates	N 28° 9' 9.068" O 16° 25' 54.443"
Total length	120 m
Touristic impact	Low/medium
Orientation	Northeast
Sand type	Fine (black)
Cleaning	Sporadic days (developed by volunteers)
Number of sampling points	10

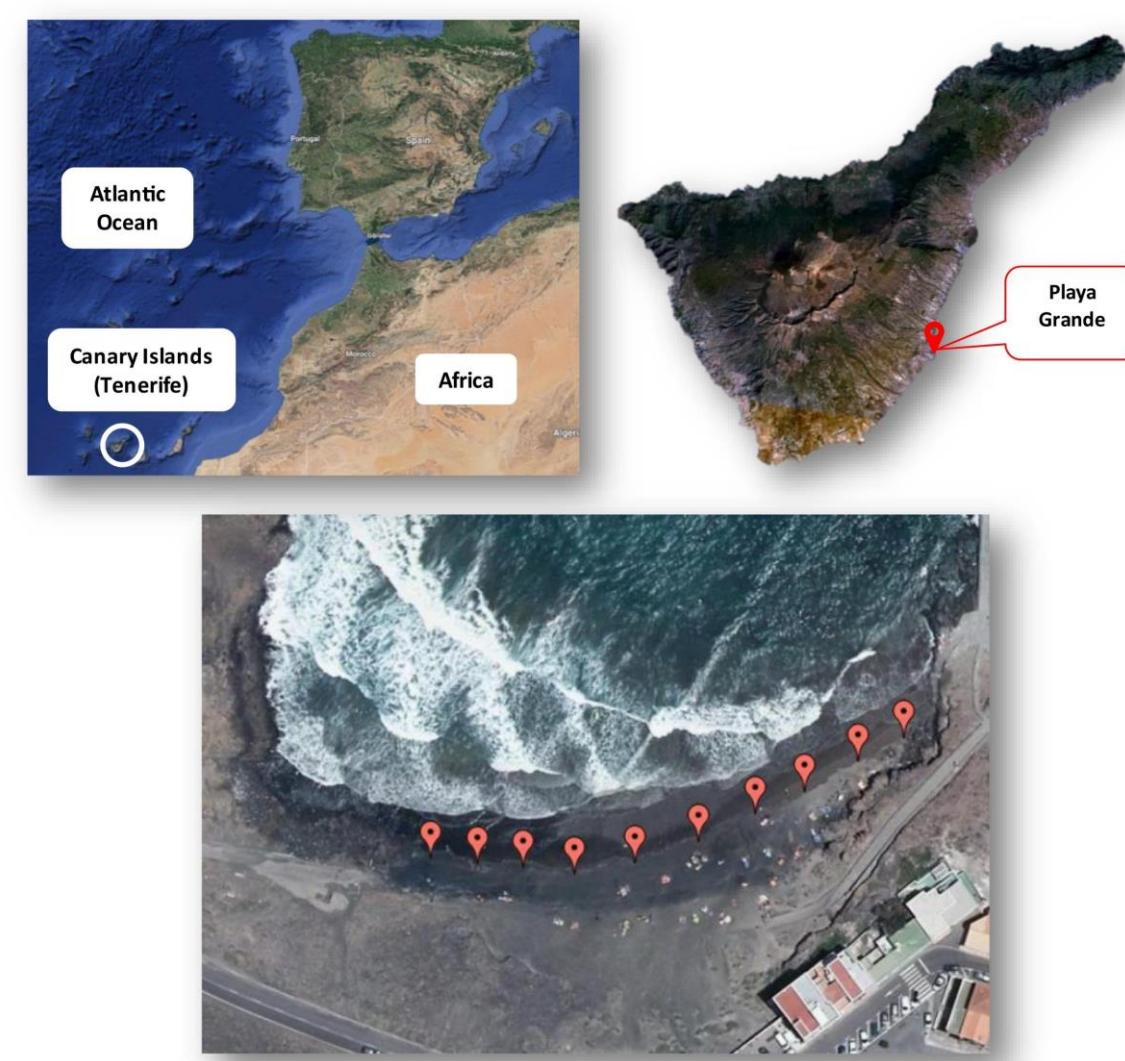
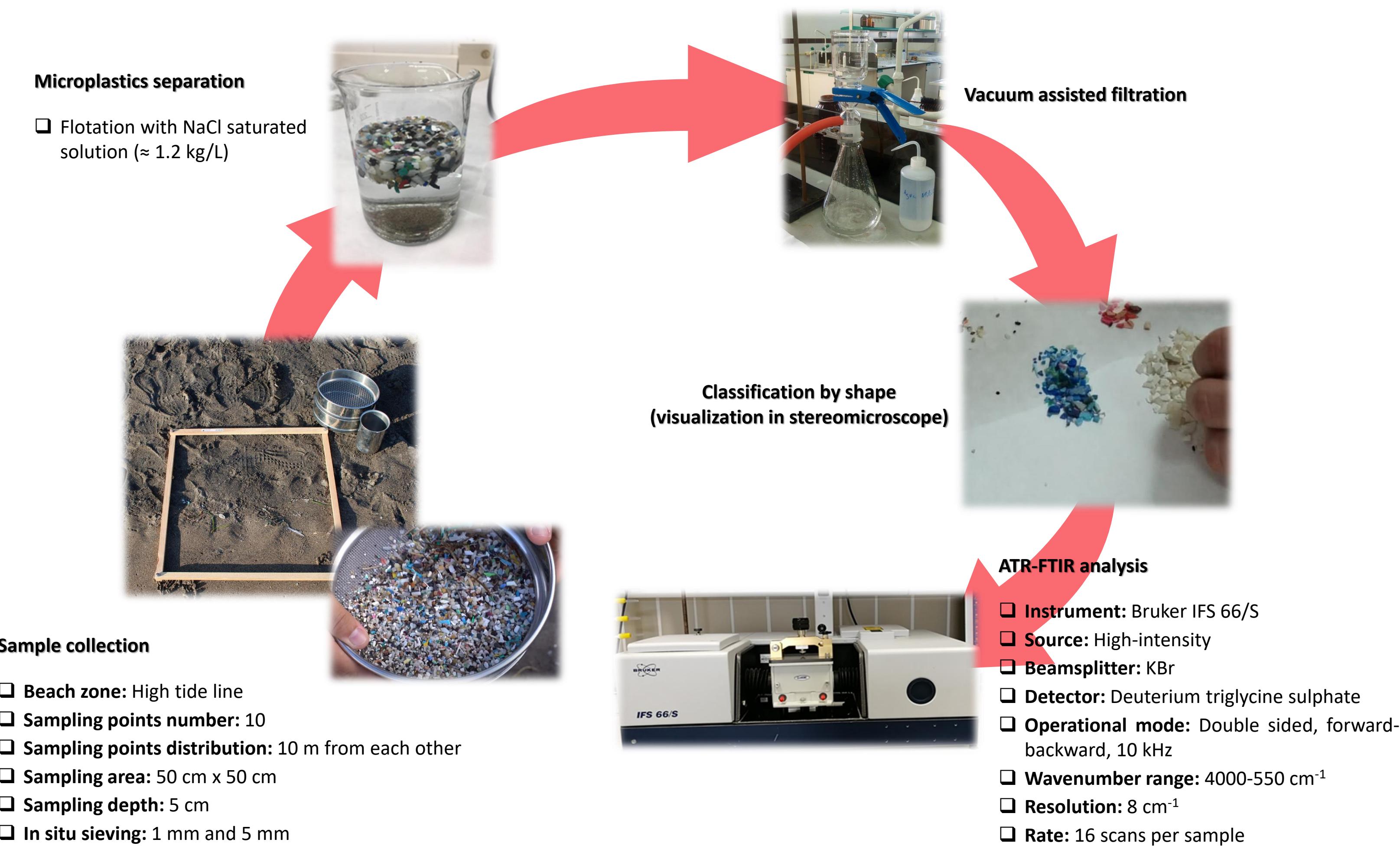


Fig. 1. Location of the Canary Islands and of the beach studied in this work (Playa Grande), as well as the satellite view of the beach showing the location of the sampling points.

### MICROPLASTICS ANALYSIS



## RESULTS AND DISCUSSION

Table 2. Amount of mesoplastics (5-25 mm) found in Playa Grande during a Moon cycle (5 sampling days).

Total weight of microplastics (g)* g/m <sup>2</sup> g/L	Mesoplastics		
	Total content	Maximum	Minimum
	226.9141	157.1329	5.8460
-	63	2.3	18
-	1.3	0.047	0.36

\*Mesoplastics were weighted using a precision balance.

Table 3. Amount of microplastics (1-5 mm) found in Playa Grande during a Moon cycle (5 sampling days).

Number of particles detected Items/m <sup>2</sup> g/m <sup>2</sup> g/L	Microplastics		
	Total content	Maximum	Minimum
	15958	6427	472
-	92.0869	2.2961	3192
6383	2571	189	32.9096
-	327	0.92	1277
-	6.5	0.018	1.6

\*Microplastics were weighted using a precision balance.



Fig. 2. Microplastic amount and number of microplastic particles found in Playa Grande during a moon cycle (June–July 2019).

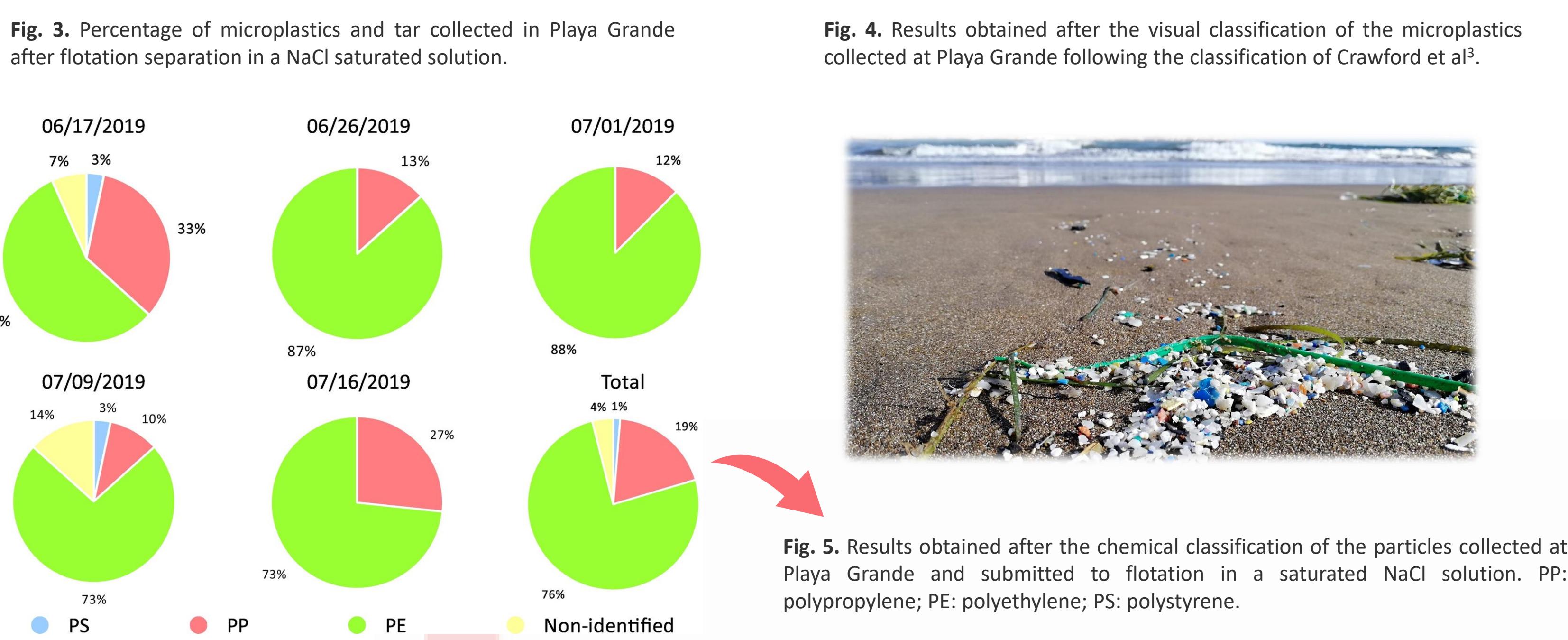
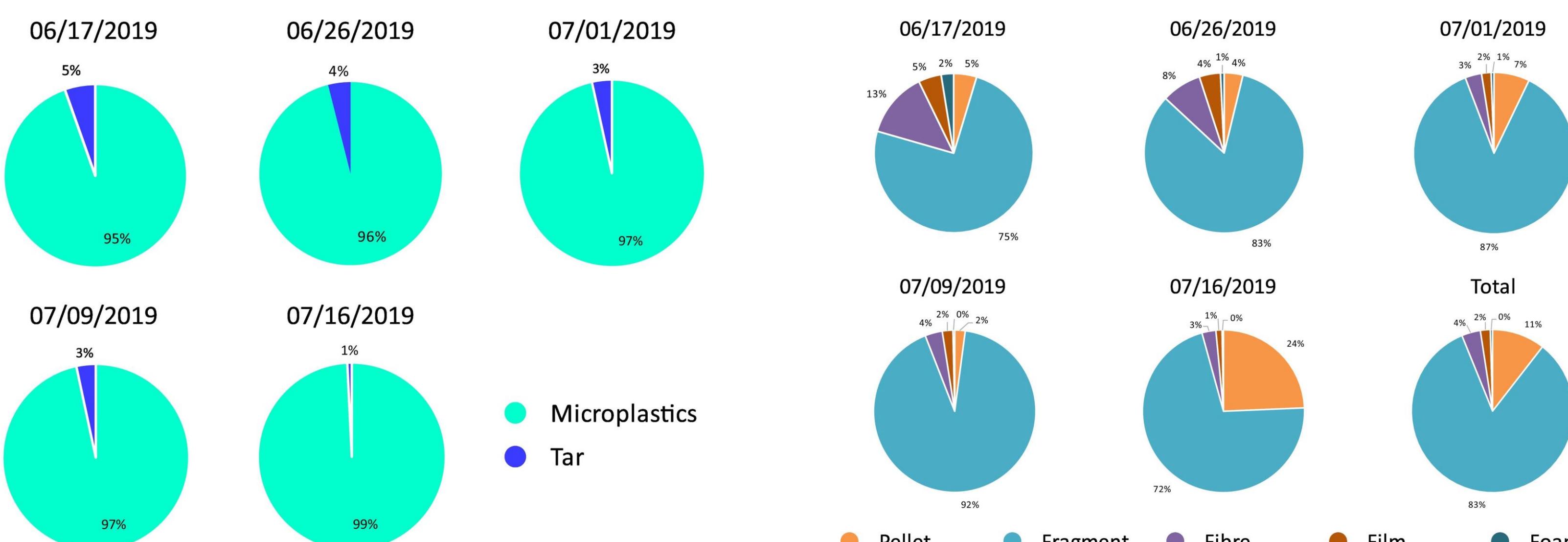


Fig. 5. Results obtained after the chemical classification of the particles collected at Playa Grande and submitted to flotation in a saturated NaCl solution. PP: polypropylene; PE: polyethylene; PS: polystyrene.

## CONCLUSIONS

- The analysis of the variation of meso and microplastic debris in Playa Grande beach (Tenerife, Canary Islands, Spain) during a moon cycle (sampling was developed on full moon, third quarter moon, new moon, first quarter moon and full moon again) revealed important variations in the amounts of plastics that arrive to the beach.
- Up to 16,000 particles were found during the whole study being the distribution of morphology and plastic types very similar to those of found in previous studies of the Canary Islands.
- No apparent relation was found between the moon phase and the presence of meso and microplastics. Indeed, an important effect of the wind direction and speed and, therefore, on the wave heights, was found (see ref. 4 for more information).

## REFERENCES

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