Traceability as a tool for identification of microplastic pollution and healthy food in the Goro lagoon

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INTRODUCION

Coastal lagoons are **ecologically** and **socio-economically important** because they provide valuable environmental services. In Italy, the **Goro lagoon (Ferrara) is characterised by numerous shellfish farms**, where the most cultivated species are clams. However, **these environments are subject to artificial pressure such as the pollution caused by microplastics**. **Contamination of** the **sediments and** thus of the **animals** reared on the sandy seabed is **possible**. As microplastics are an emerging contaminant and there is no limit to the amount of microplastics found in livestock**, it is important to track the movement of livestock from seed to sale**. **Software** is being **developed** to **digitise all the steps along the supply chain, allowing consumers to know the origin of the product, whose quality is judged by the amount of microplastics found in the sediments and in the animals. The result will be an assessment not only of the quality of the product, but also of the level of pollution in the lagoon where the clams have been farmed.**

SAMPLE AND SAMPLING AREA

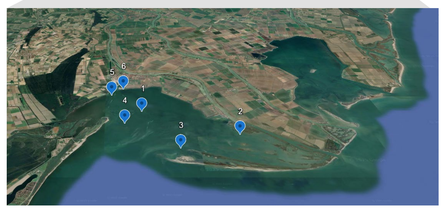
CLAM

(Ruditapes philippinarum)
from local fish market

SEDIMENT

ID SAMPLE	GRAVEL (%)	SAND (%)	MUD (%)
1	0,00	54,04	45,96
2	0,00	9,96	90,04
3	0,00	23,12	76,88
4	0,00	78,48	21,52
5	0,00	45,20	54,80
6	0,00	21,83	78,17

GORO LAGOON



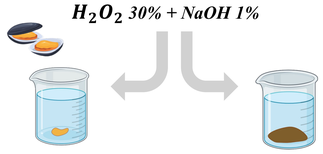
Sediments were sampled at 6 different locations in the Goro Lagoon

MICROPLASTIC EXTRACTION AND QUANTIFICATION IN CLAMS AND SEDIMENTS

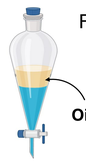
1) SAMPLE PRETREATMENT

For eliminating the organic matter

H_2O_2 *30% + NaOH 1%*



2) PURIFICATIION WITH OIL



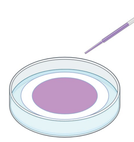
For greater sample purification: oil can capture all microplastics in the sample

Oily fraction with MP

3) FILTRATION

The oily part with microplastics is filtered on Glass-fiber filter GF/D

4) NILE RED STAINING

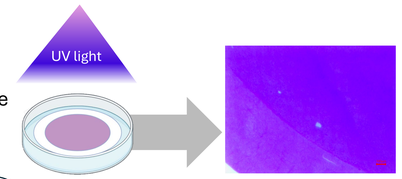


Nile Red is a hydrophobic dye that bind the microplastics. The colorant is used in concentration: 10 µg/ml in Acetone

5) QUANTIFICATION

- Microplastics were quantified a stereomicroscope equipped with UV light
- Each visible microplastic was photographed and some parameters were measured with imageJ

Area, Perimeter, circumference, Feret, Median, FeretX, FeretY, feretangle, Minferet, AR, Round, Solidity



SCAN IT, IF YOU WANT TO SEE TRACEABILITY PART!

PRELIMINARY RESULTS AND CONCLUSION

- Most microplastics were found in sediments 2 and 6, with an average of 11 MPs per sample. The MPs have a Feret: 33-125 µm.
- Of the 6 animals analysed, only 3 presented microplastics, with an average of 3 microplastics per animal. The presence of a limited amount of MPs in the animals is probably due to the previous cleaning of the animals in the establishments before sale. It would be useful to be able to analyse the microplastic content before depuration and to calculate the time needed to remove microplastics.
- These are preliminary results and it is intended to expose the filters to RGB light to assess the presence of additional MPs not visible to UV. In addition, RAMAN analyses will be carried out for identification.

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