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Microsistemi
Consiglio Nazionale delle Ricerche



DIPARTIMENTO DI BIOLOGIA
UNIVERSITÀ DEGLI STUDI DI PADOVA

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Ministero della Salute

Italian study on the exposure to microplastics (MPs) and nanoplastics (NPs) related to human consumption of striped venus clam *Chamelea gallina*

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Chamelea gallina



No published data on MPs and NPs in clams caught from Middle Adriatic Sea

Introduction

- The striped venus clam is largely consumed in Italy, caught from natural banks present in the coastal waters.
- PLASTICVONG project will develop and apply advanced measures to assess the MP/NP exposure for consumers of clams caught in the Central Adriatic Sea, deepening the knowledge of physiological effects to environmental dose in the same clam species in vivo.

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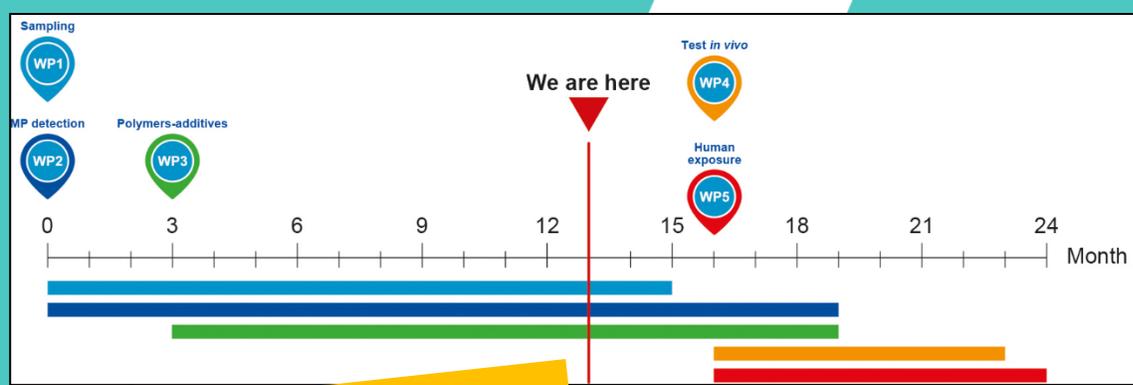
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Objectives

- to detect and characterize MPs ($> 1 \mu\text{m}$) in clams caught in the Middle Adriatic Sea by stereomicroscopy and Raman microspectroscopy;
- to quantify MPs and NPs made by PET and PC, paraphthalic acid (PTA), bisphenol A (BPA) by LC-MS/MS; (additionally other BPs and method development by Pyr-GC/MS)
- to evaluate the transcriptional and metabolic changes induced by experimental clam exposure to environmental dose of MPs/NPs/BPA, linking them to genome methylation profiles;
- to evaluate the exposure to MPs and NPs related to the human consumption of *C. gallina* caught in the Central Adriatic Sea.

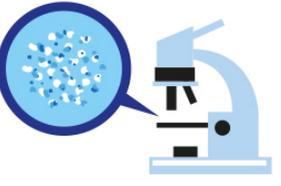
Project structure



We are halfway there

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WP1 Sampling campaign of clams 

WP2 MP detection and characterization by stereomicroscopy and RAMAN 

WP3 MPs + NPs in PET and PC; PTA and BPA detection by LC-MS/MS 

In addition other BPs by LC-MS/MS and method development by Pyr-GC/MS

WP4 *In vivo* test 

WP5 Evaluation of human exposure to NPs and MPs 

First results at stereomicroscopy

- Standard operating procedure to detect potential MPs ($> 1 \mu\text{m}$) in bivalves, validated and with quality control in each analytical session (environmental control, procedural blank and positive control);
- MPs were detected in 90% samples (from 0 to 2.62 MPs no * indiv⁻¹; from 0 to 2.3 MPs no * g⁻¹);
- fragment was the most abundant morphotype;
- black, brown and blue were the most abundant colours.

RAMAN characterisation is on-going



Teflon

LC-MS/MS: first results

- PET was detected in all samples (137.79 – 547.18 ng/g);
- PC in 30% samples (9.01 – 17.52 ng/g);
- BPA in 40% samples (5.96 – 40.80 ng/g);
- PTA in 40% samples (11,81 – 270,26 ng/g);
- Other analoug bisphenols all < LOQ in all samples.

Validated method and with quality control

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MANY THANKS!

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Mid term conclusion

First results showed that plastic polymers were detected in all samples through validated methods and giving attention to guarantee quality control that are crucial points for the detection of plastic materials.

Concerning the effect on clam physiology and human exposure we have to wait the end of the project.

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