



<https://www.imptox.eu/en/>

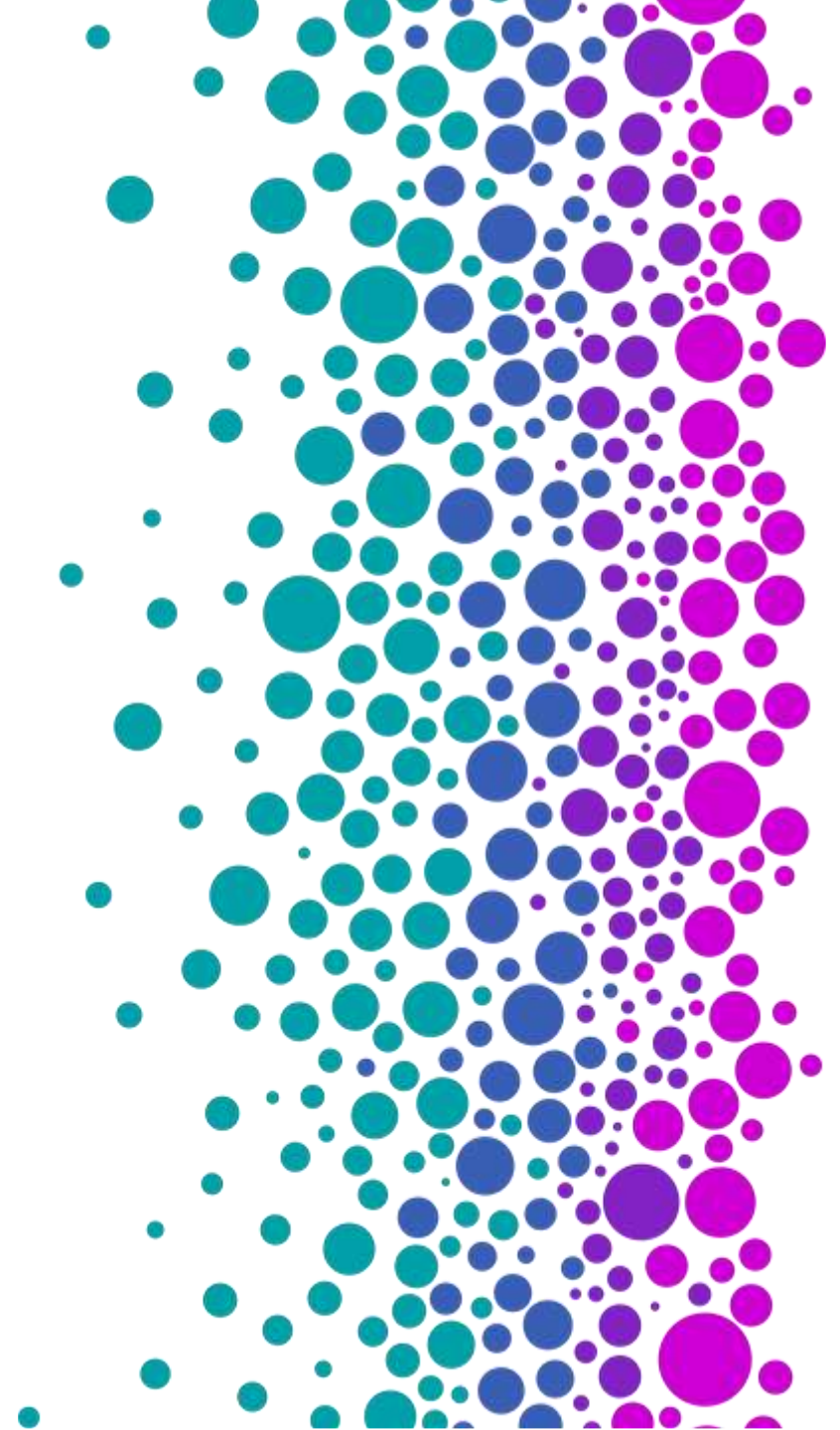
# Optimizacija microFTIR analize za određivanje mikroplastike

TAMARA MUTIĆ

UNIVERZITET U BEOGRADU - HEMIJSKI FAKULTET



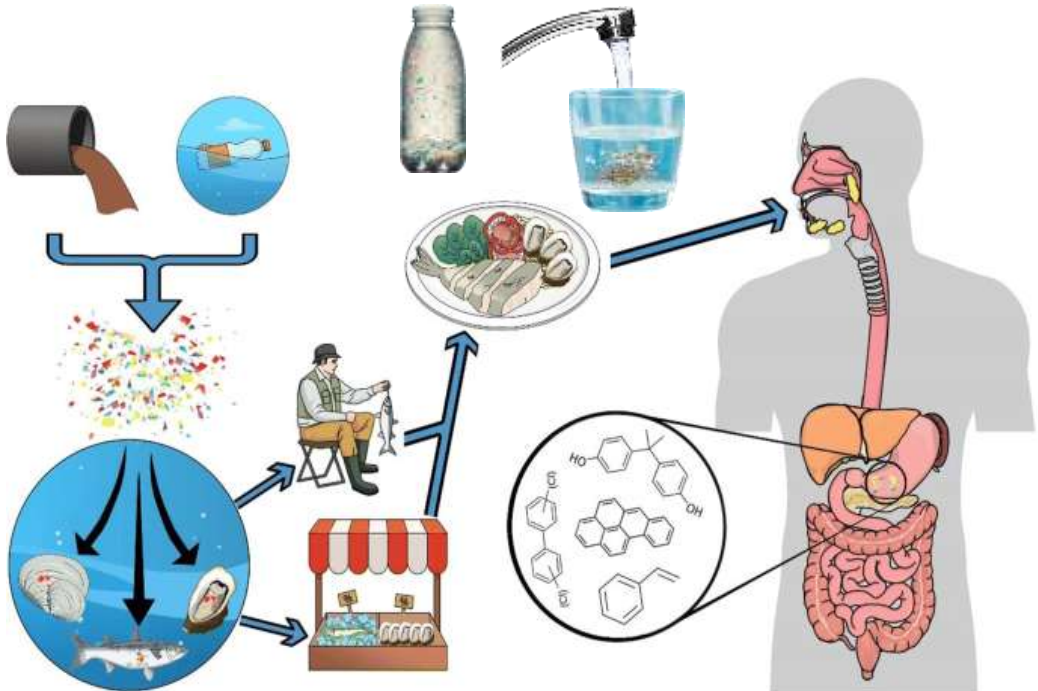
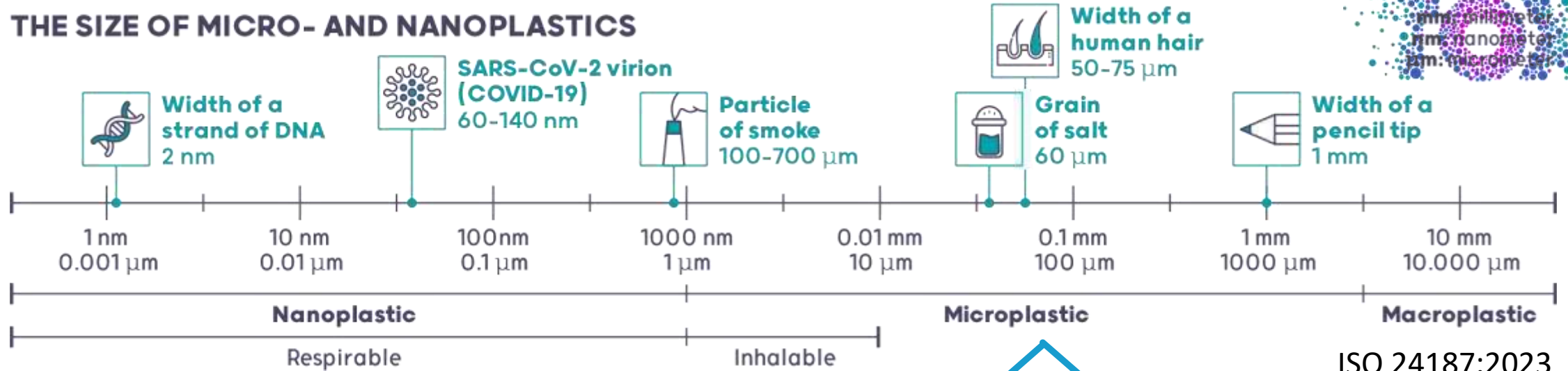
Imptox project has received funding from the EU's H2020 framework programme for research and innovation under grant agreement n. 965173



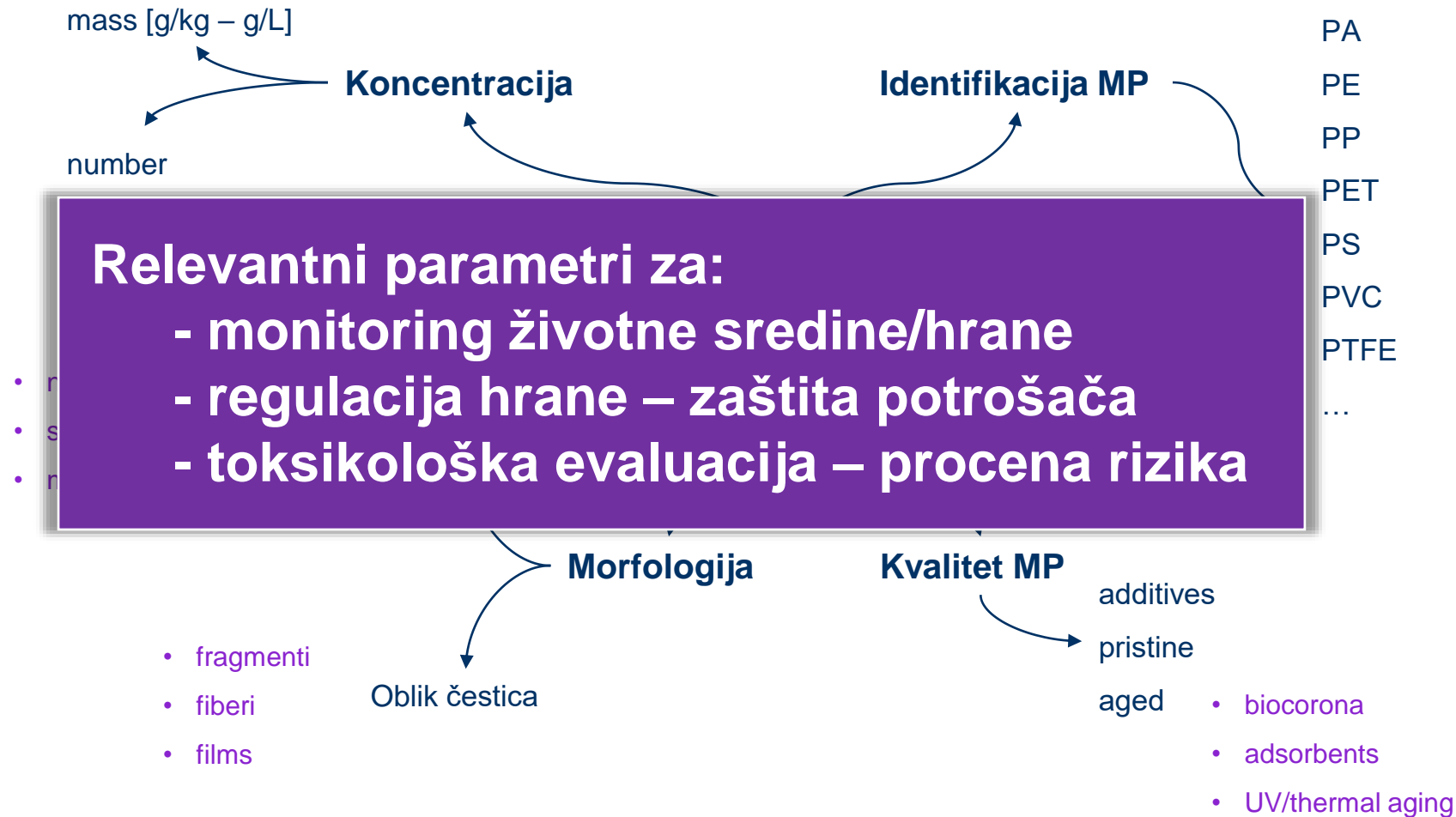
# MIKROPLASTIKA

# IMP

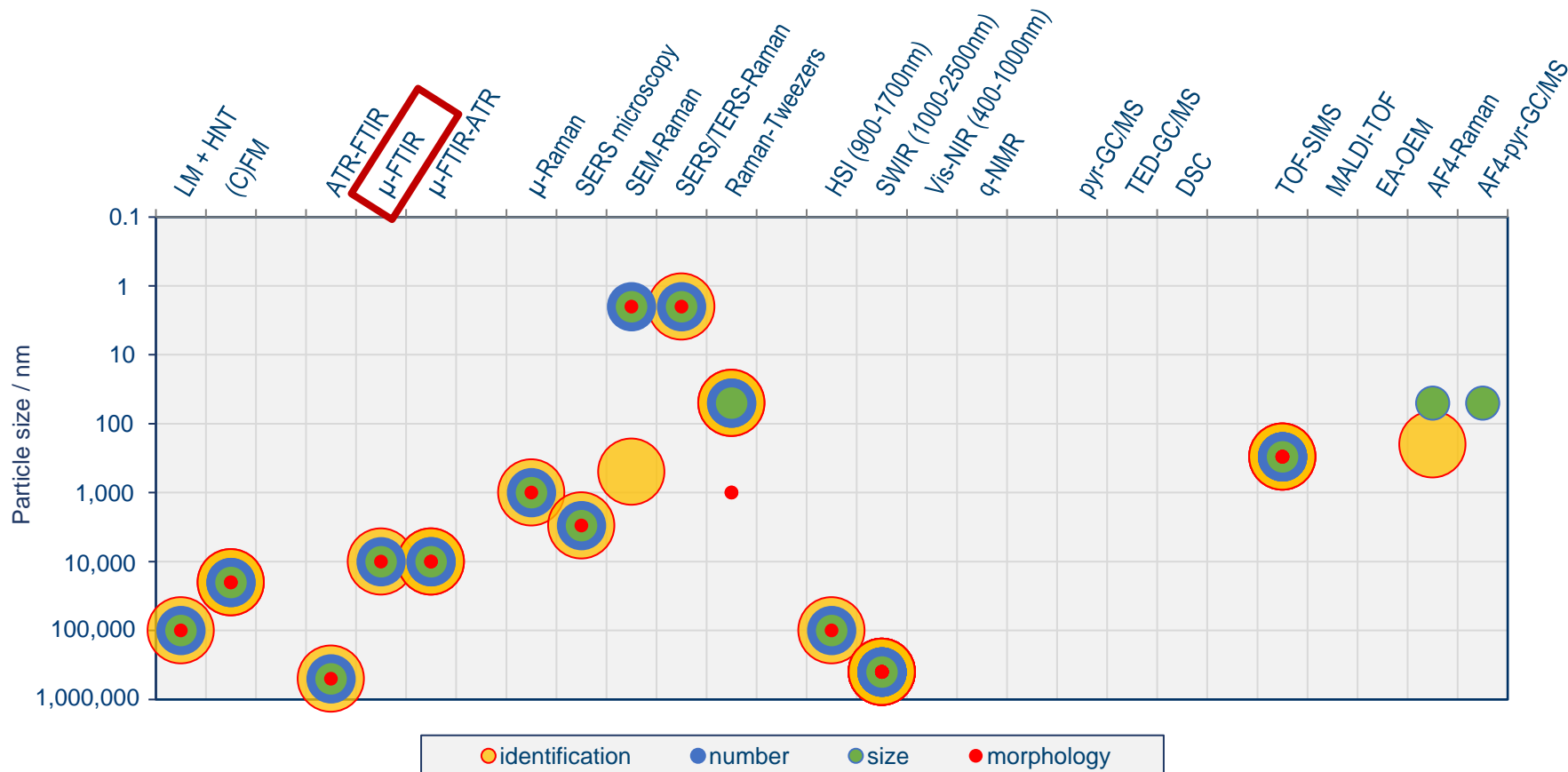
## THE SIZE OF MICRO- AND NANOPLASTICS



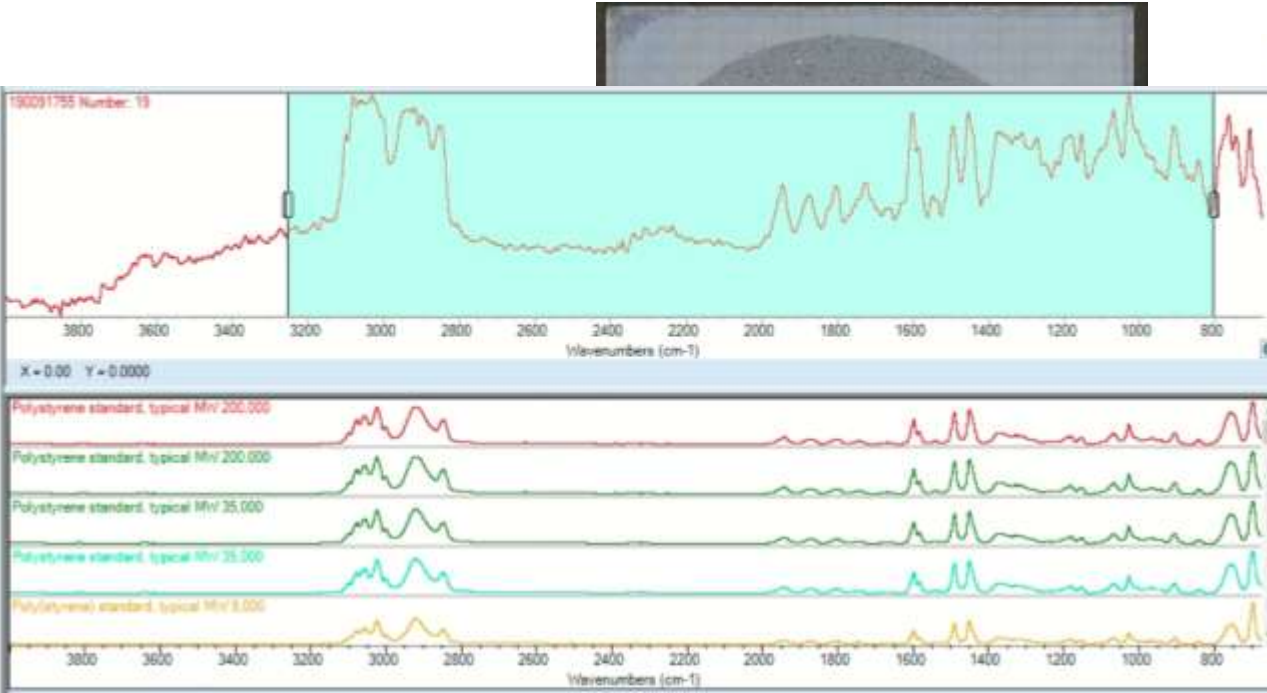
# MNP – ANALITIČKA MERENJA



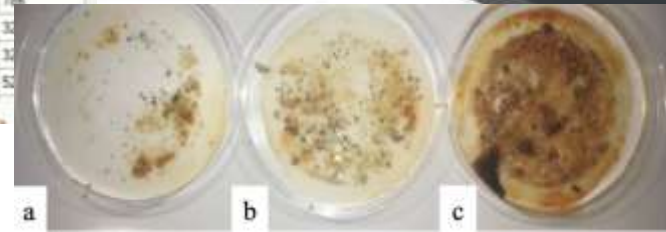
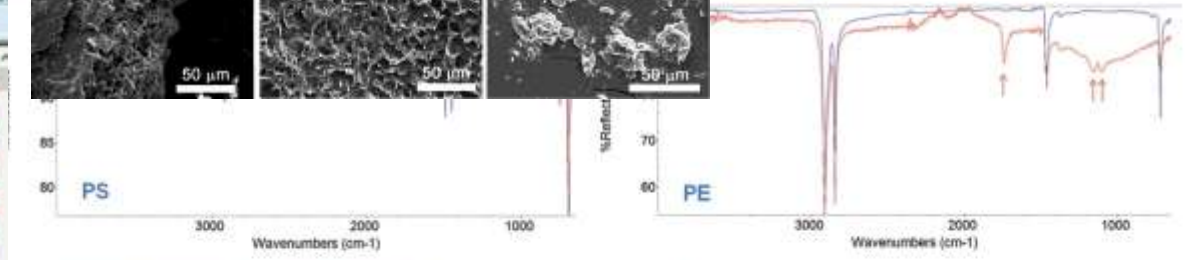
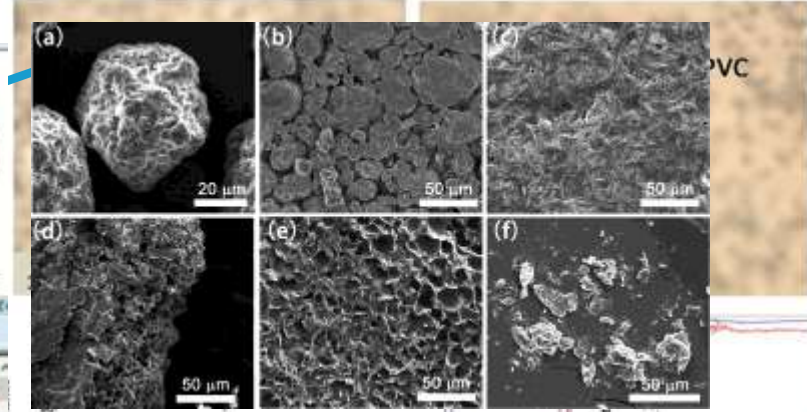
# IDENTIFIKACIJA + DISTRIBUCIJA + KVANTIFIKACIJA + MORFOLOGIJA



# PRIPREMA UZORAKA



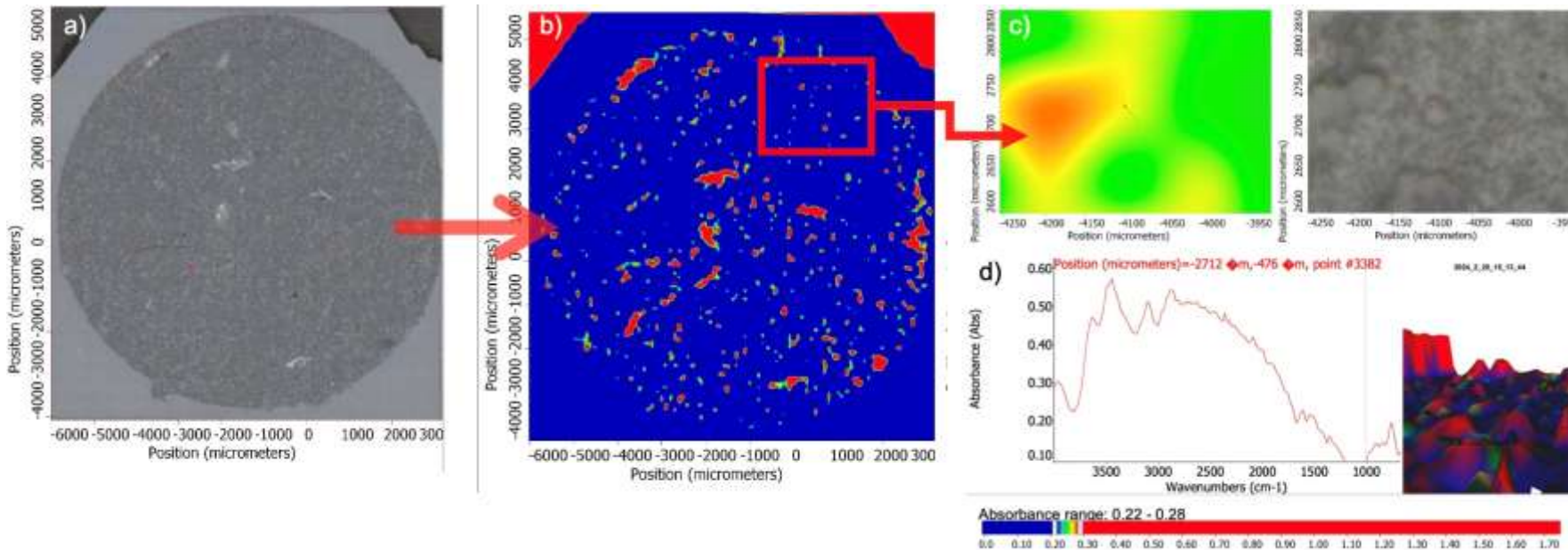
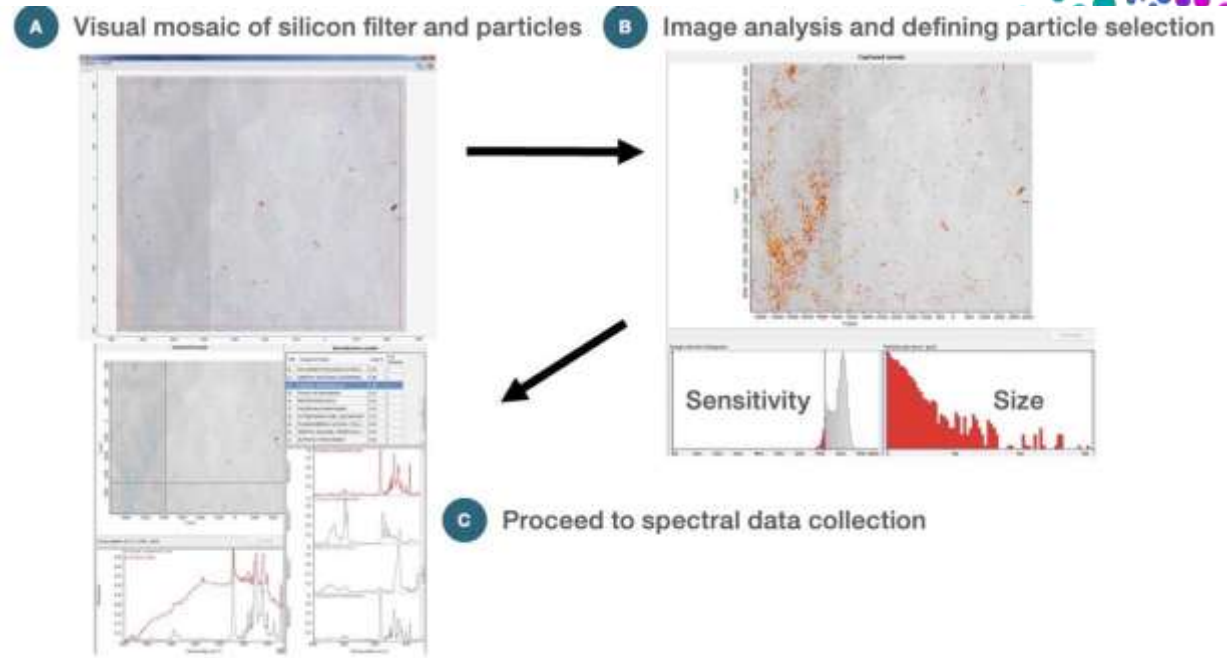
Match	Title	Range	Folder	Filename	Index
1	Polystyrene standard, typical MW 200,000	3250.0-802.0	Aldrich FT-IR Collection Edition II	c:\my documents\180718	180718
2	Polystyrene standard, typical MW 200,000	3250.0-802.0	Aldrich FT-IR Collection Edition II(T)	c:\my documents\180718	180718
3	Polystyrene standard, typical MW 35,000	3250.0-802.0	Aldrich FT-IR Collection Edition II(T)	c:\my documents\180715	180715
4	Polystyrene standard, typical MW 35,000	3250.0-802.0	Aldrich FT-IR Collection Edition II(T)	c:\my documents\180715	180715
5	Polystyrene standard, typical MW 3,000	3250.0-802.0			180715
6	Polystyrene standard, typical MW 3,000	3250.0-802.0			180713
7	LATEX 238	3250.0-802.0			180713
8	LATEX 238	3250.0-802.0			786
9	Polystyrene	3250.0-802.0			786
10	Polystyrene	3250.0-802.0			30
11	Polystyrene	3250.0-802.0			30



- a) multistepena digestije upotrebom baze, enzima i oksidativnih regenasa
- b) digestija bazom i enzimima
- c) digestija bazom.

Microscope

	Automatska analiza	Poluautomatska analiza
Vreme analize	> 8 h	~ 4 h
Hemijska karakterizacija	Mogućnost detektovanja svih polimera	
Kvantifikacija MP	Algoritam za prepoznavanje čestica	Ručna provera čestica
Veličina čestica		Ručno proveravanje lenjirom
Prepoznavanje čestica		Mapiranje površine filtera



# MEĐULABORATORIJSKA STUDIJA VAMAS/TWA 45/P2-CUSP ILC

BAM - The Federal Institute for  
Materials Research and Testing



Procenjen broj MP – snimljen deo filtera

Uzorak	Ukupan broj MP - Automatska analiza	Procenjeni broj MP – Poluautomatska analiza
Uzorak 1	13	496
Uzorak 2	15	372
Uzorak 3	9	435
Blank uzorak	0	0
Prosečno MP po uzorku	12.3	434 ± 62

Zbog gustine i zasićenosti čestica,  
softver ne može da razlikuje čestice

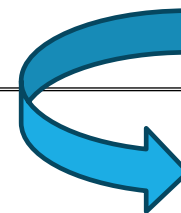
# REALAN UZORAK



Uzorak	Identifikovani polimer	Matching [%]	
		Automatska analiza	Poluautomatska analiza
WP4_SRB_2_FRESH_1	Polyethylene	78.87	84.32
WP4_SRB_2_FRESH_2	/	/	/
WP4_SRB_2_FRESH_3	/	/	/
WP4_SRB_2_FRESH_4	Polystyrene	87.87	88.01
WP4_SRB_2_FRESH_5	Polyethene	72.1	87.43



*Vongola clams*



Zbog efikasne digestije i malog broja čestica na filter rezultati su isti

# RAZVOJ I OPTIMIZACIJA PROTOKOLA ZA MICROFTIR ANALIZU MIKROPLASTIKE



1. Optimizovan protokol digestije (voda, morski organizmi, uzorci dečijih stolica...)
2. Oprimizovana poluautomacka metoda snimanja
3. In-house baze podataka & referentni materijali
4. Laboratorija opremljena samo za potrebe analize mikroplastike
5. Međunarodni i nacionalni projekti & interlaboratorijska poređenja

**HVALA NA PAŽNJI!**

[tmusic@chem.bg.ac.rs](mailto:tmusic@chem.bg.ac.rs)



Imptox project has received funding from the EU's H2020 framework programme for research and innovation under grant agreement n. 965173