

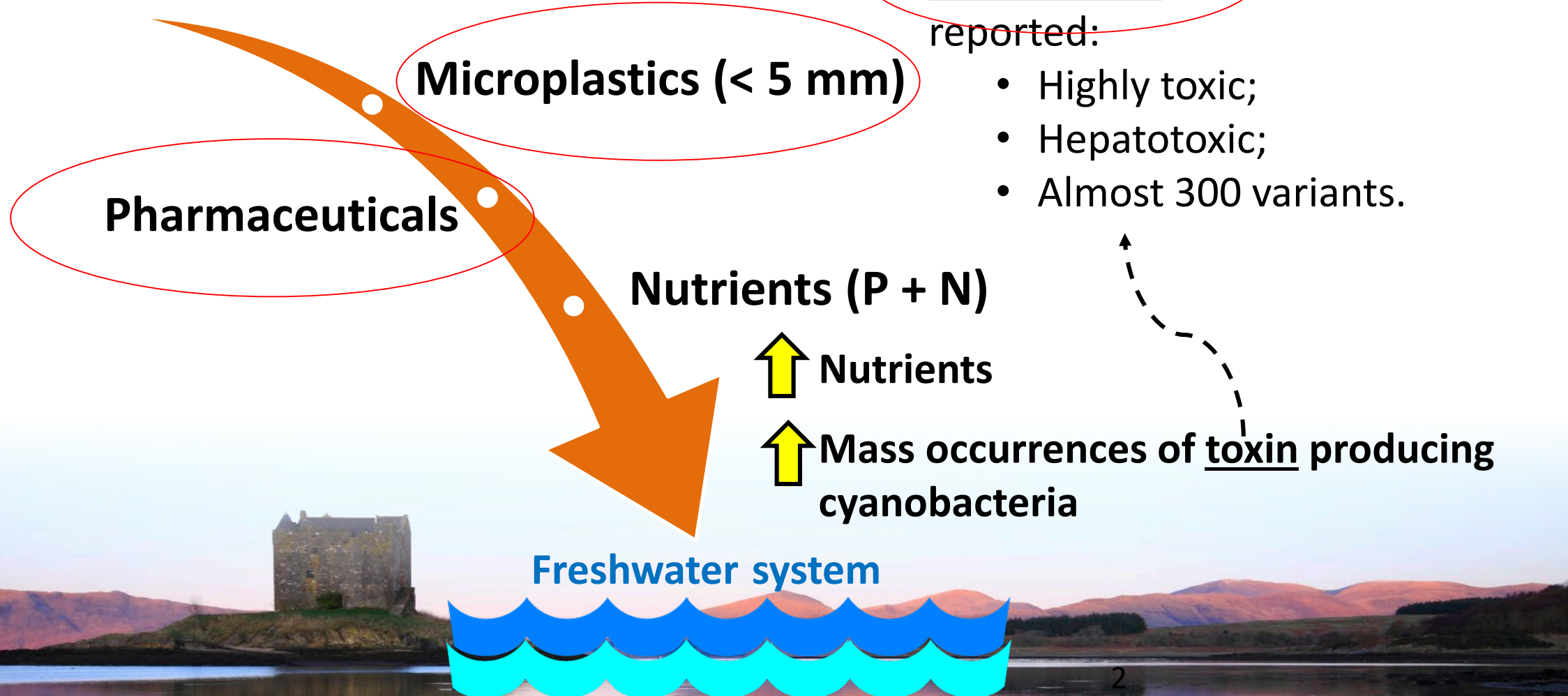
# Microplastics as a Vector for Micropollutants in Aquatic Environments

Diana Souza Moura





## Discharge of untreated wastewater and WWTP effluents



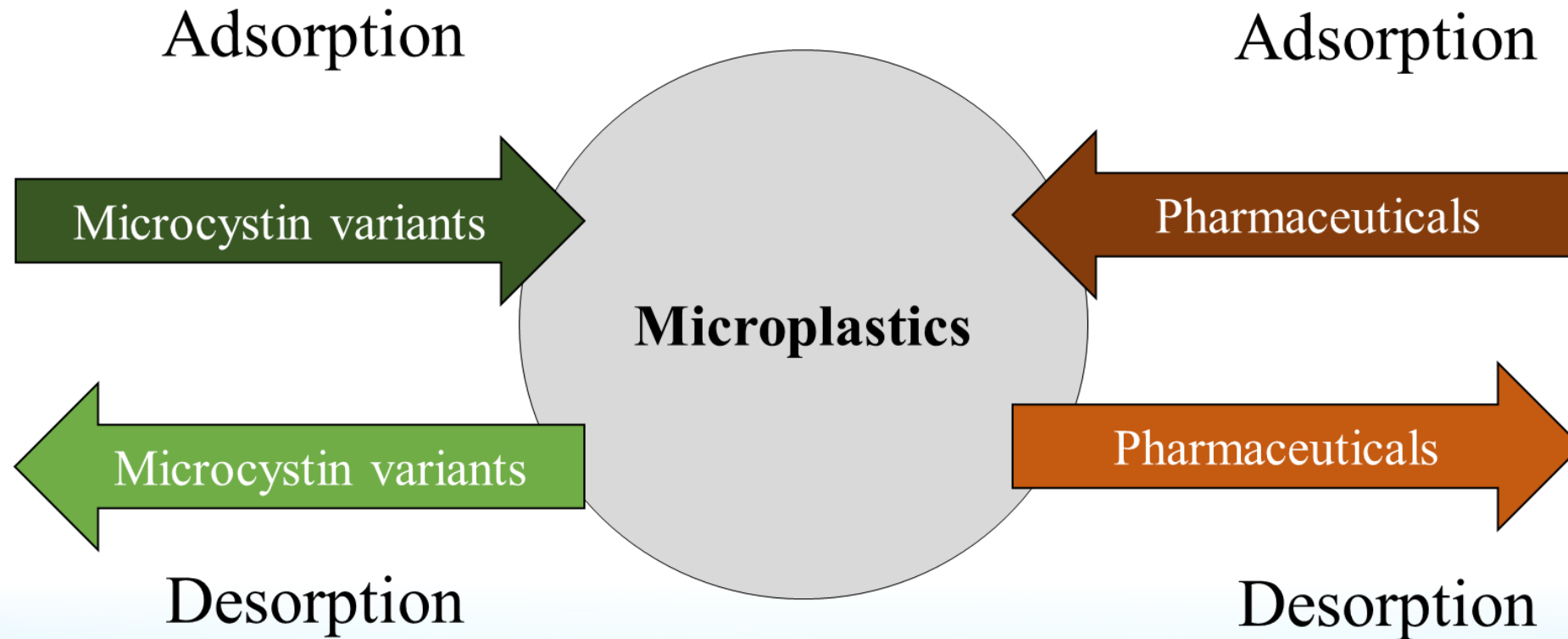


# Introduction/Aims & objectives



Scottish  
Government  
gov.scot

Hydro Nation Scholars Programme





- Selection of the polymers
  - Polypropylene (PP)
  - Polyethylene terephthalate (PET)
  - Polyethylene (PE)
  - Polystyrene (PS)
  - Polyvinyl Chloride (PVC)
  - Polyamide (PA)
- Polymer characterisation (FT-IR, SEM images, BET analysis, XRD patterns)
- Experiment with a mixture of microcystin analogues



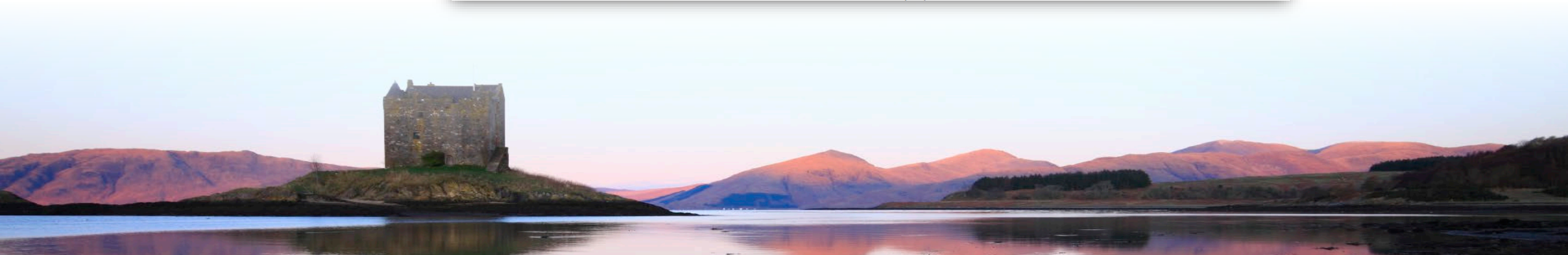
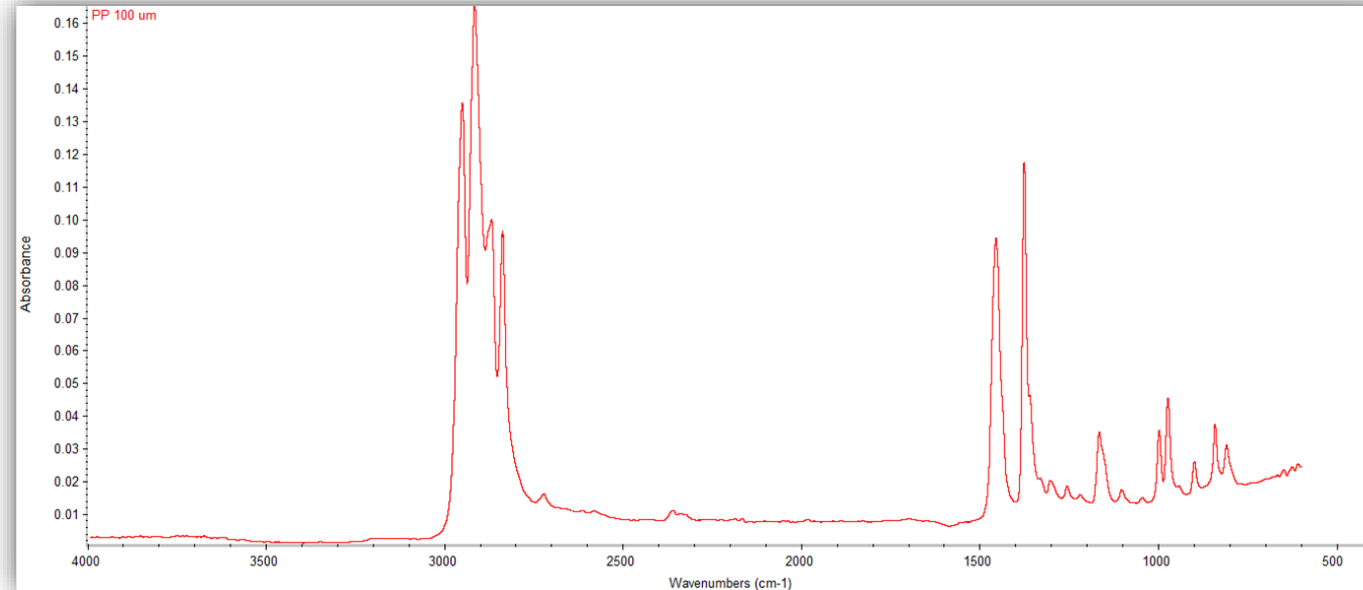
80 % of the  
EU plastic  
annual  
demand  
(2019)

Most  
reported in  
the  
freshwater  
environment





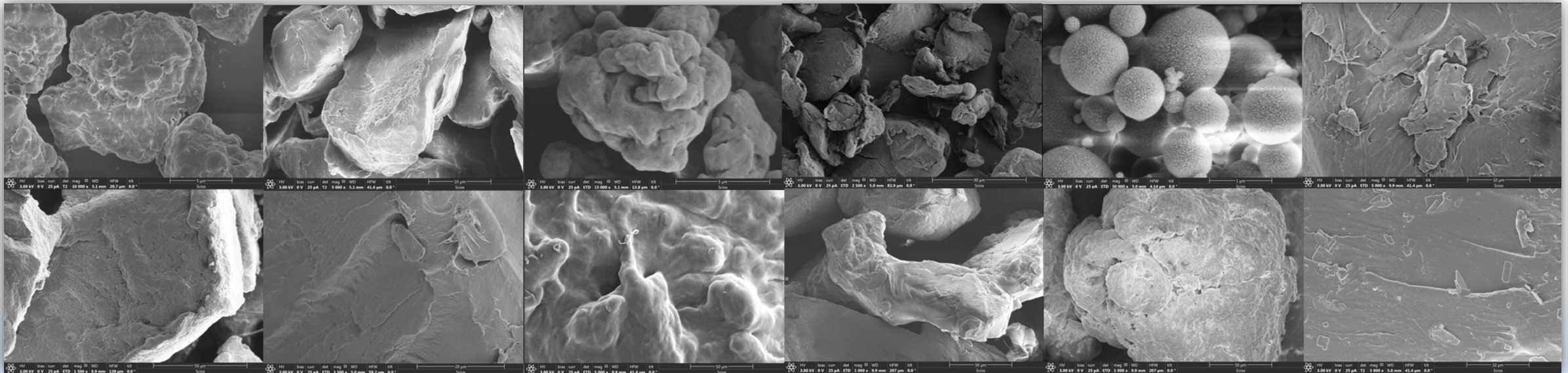
- Characterisation of the microplastic
  - FT-IR analysis





# Findings

- Characterisation of the microplastic
  - FT-IR analysis
  - SEM images



Polypropylene (PP)

Polyethylene  
terephthalate  
(PET)

Polyethylene (PE)

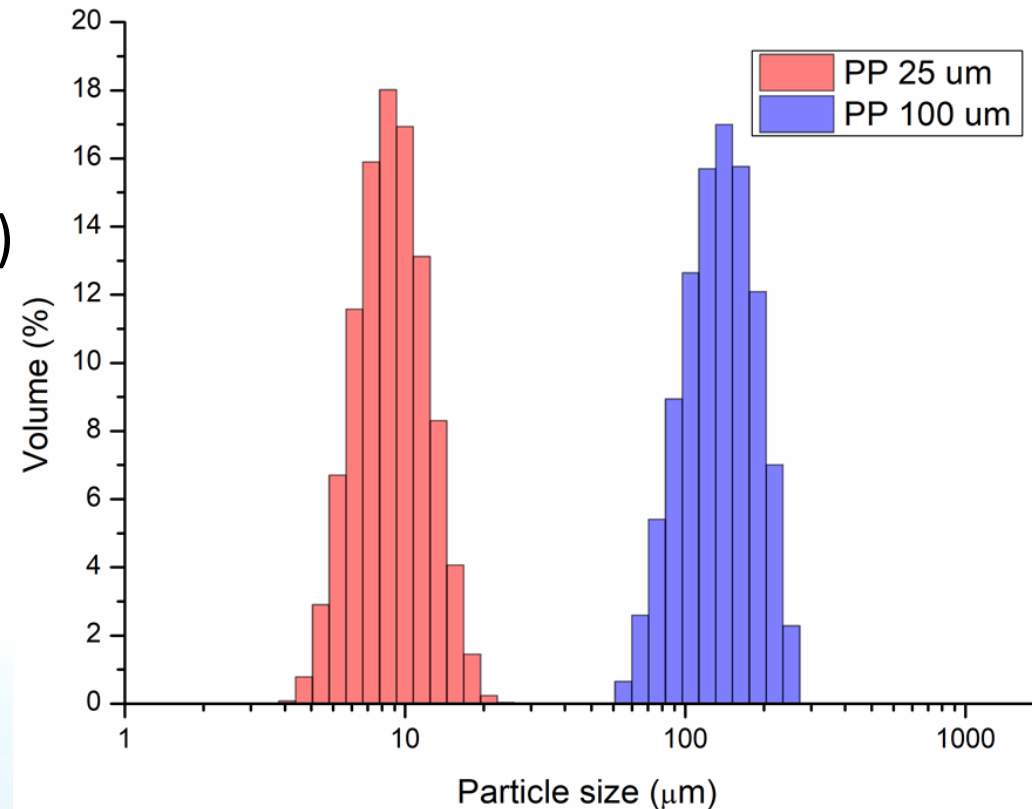
Polystyrene (PS)

Polyvinyl  
Chloride (PVC)

Polyamide (PA)



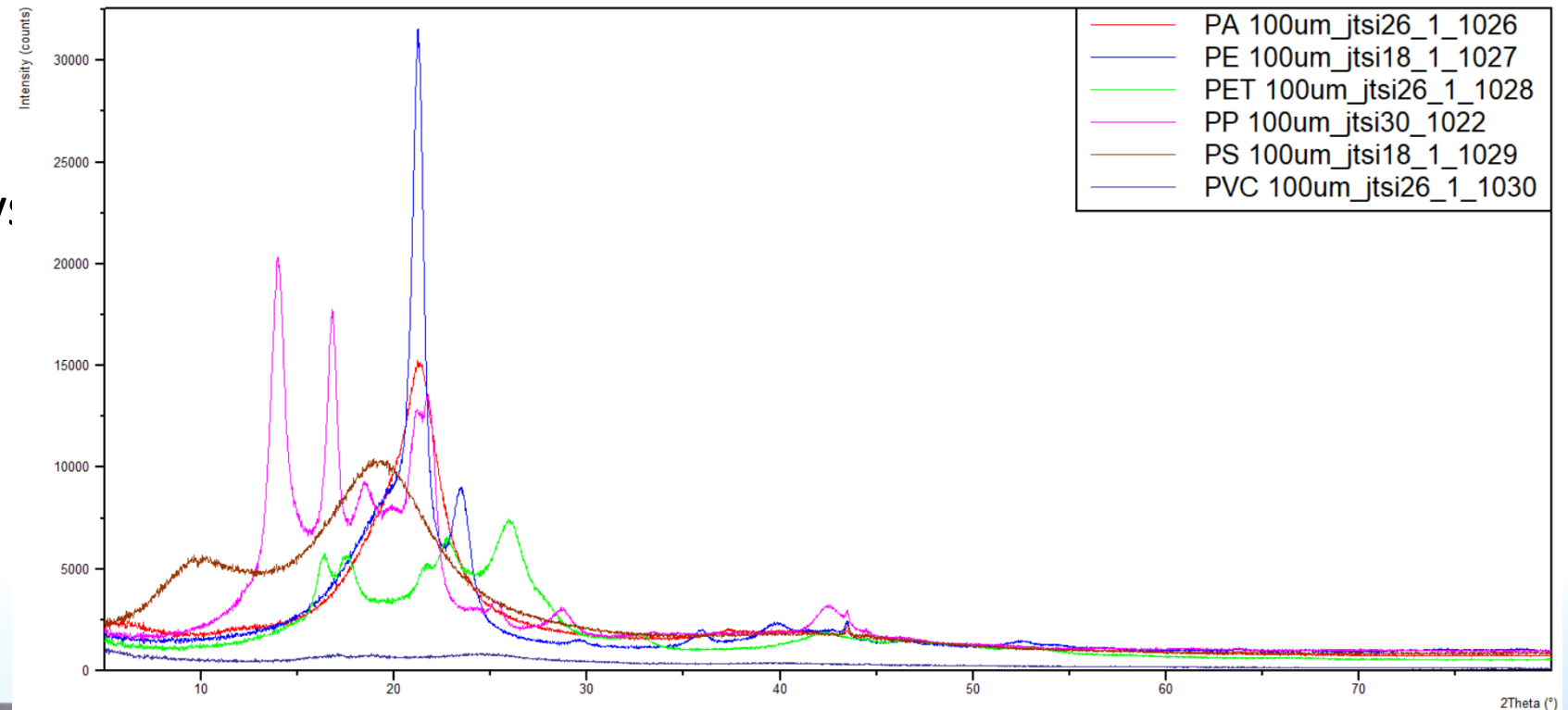
- Characterisation of the microplastic
  - FT-IR analysis
  - SEM images
  - Particule size analysis (PSA)
  - BET analysis





- Characterisation of the microplastic

- FT-IR analysis
- SEM images
- Particule size analysis
- BET analysis
- XRD pattern





# Approach

- Adsorption of microcystin analogues onto PP and PET

PP

Particle size: 15-25  $\mu\text{m}$

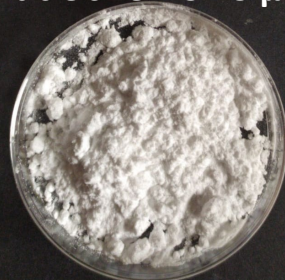


Particle size: 100  $\mu\text{m}$



PET

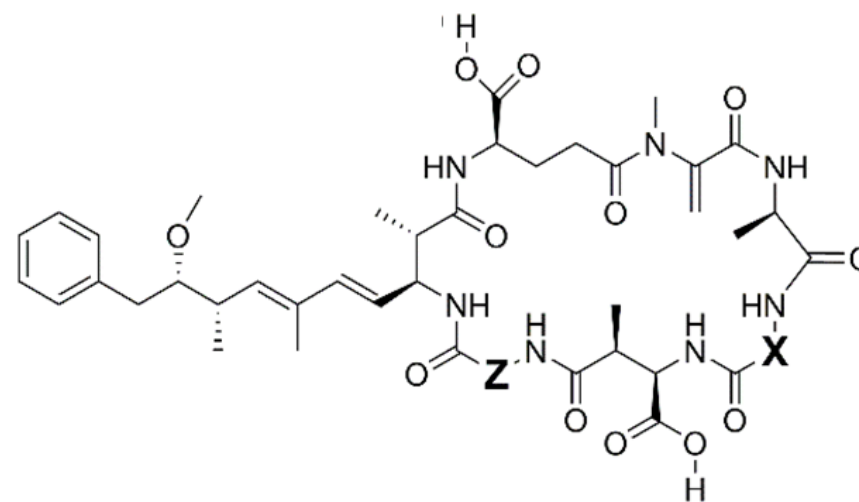
Particle size: 15-25  $\mu\text{m}$



Particle size: 100  $\mu\text{m}$



Mixture of 8 microcystin analogues



MC-RR   -YR   -LR   -WR   -LA   -LY   -LW   -LF

Microcystin hydrophobicity

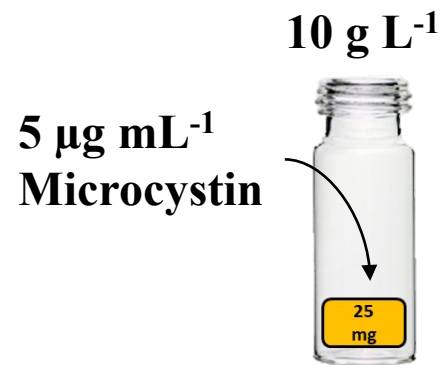




# Approach

## Sampling times:

0  
2 h  
4 h  
6 h  
8 h  
12 h  
24 h  
48 h



Toxins in contact  
with polymers shaking  
in the dark for 48h



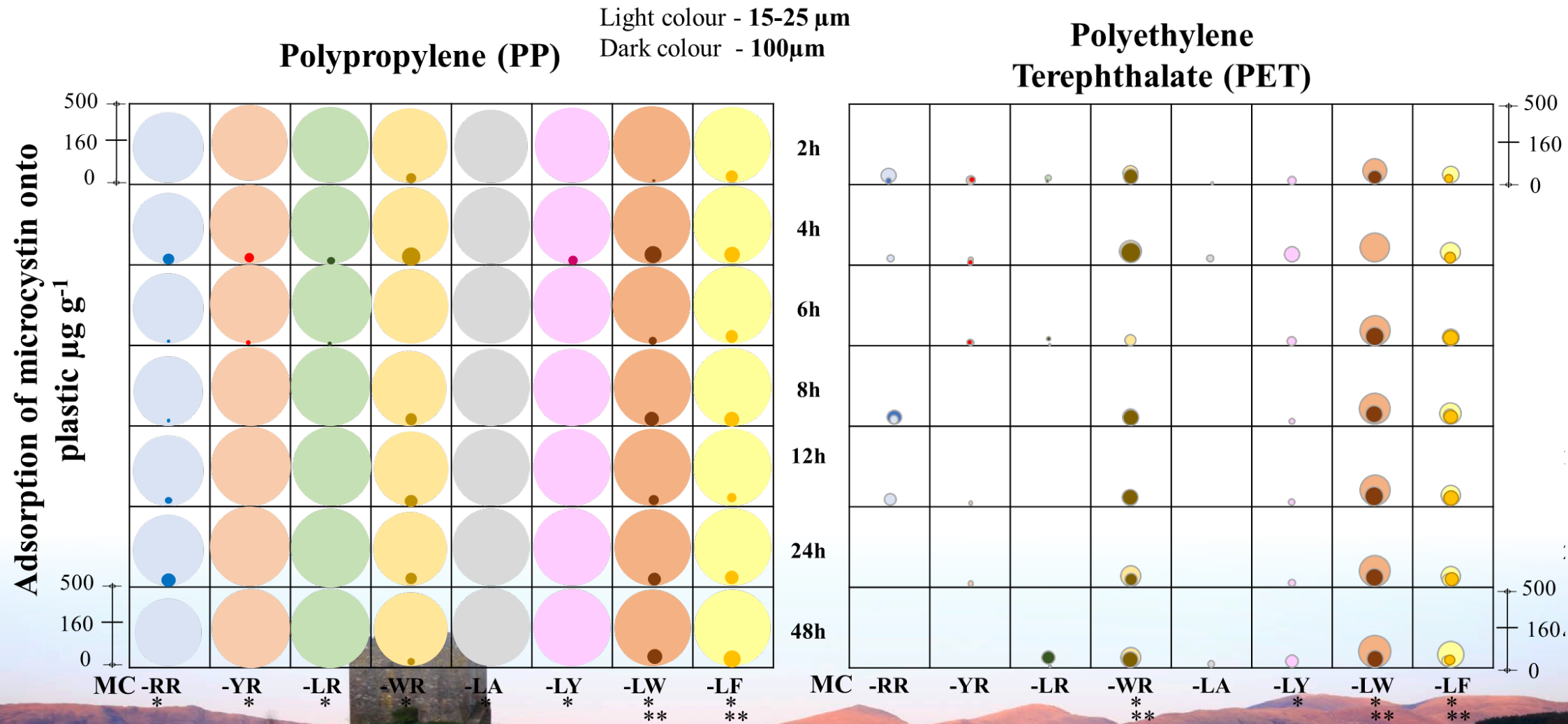
Centrifuge for 2 min at  
4000 rpm using



**High performance liquid  
chromatogram – PDA ANALYSES**

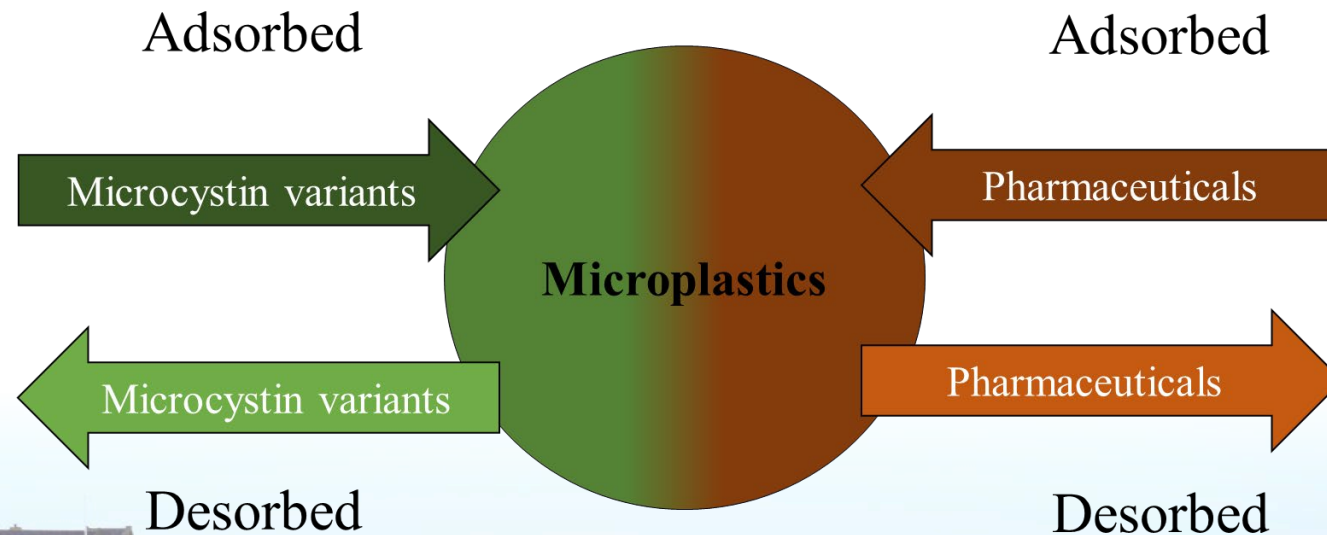


# Findings



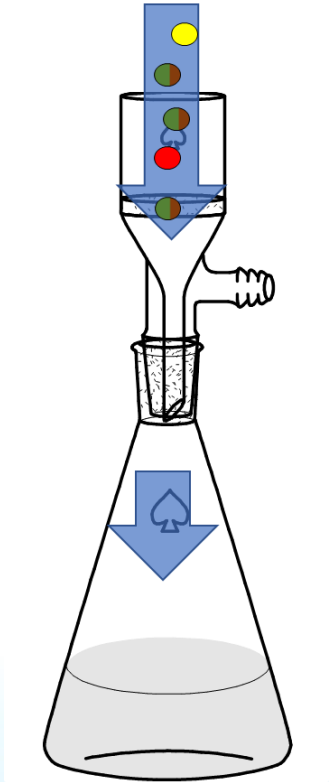
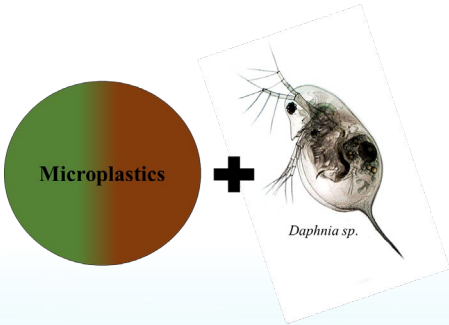
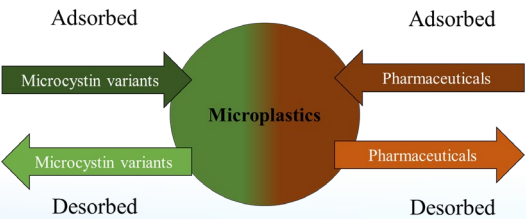
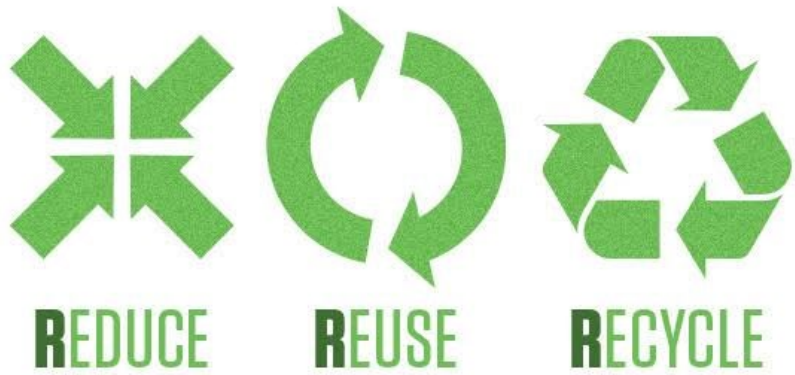


- 11<sup>th</sup> Scottish Symposium on Environmental Analytical Chemistry
- Manuscript in preparation
- STEM Public Engagement
- Future work:





# Future work





# Thanks

For further information & updates, please  
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[www.hydronationscholars.scot/scholars/diana-souza-moura](http://www.hydronationscholars.scot/scholars/diana-souza-moura)



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