

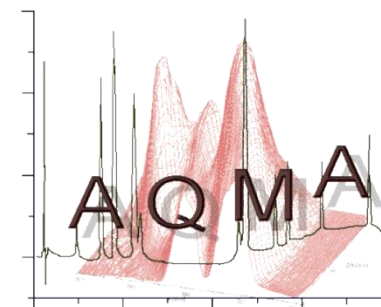
# IMEPA 2014

## AN APPROACH TO MICROEXTRACTION TECHNIQUES APPLIED TO THE DETERMINATION OF EMERGING CONTAMINANTS IN ENVIRONMENTAL LIQUID SAMPLES

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UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA  
Departamento de Química

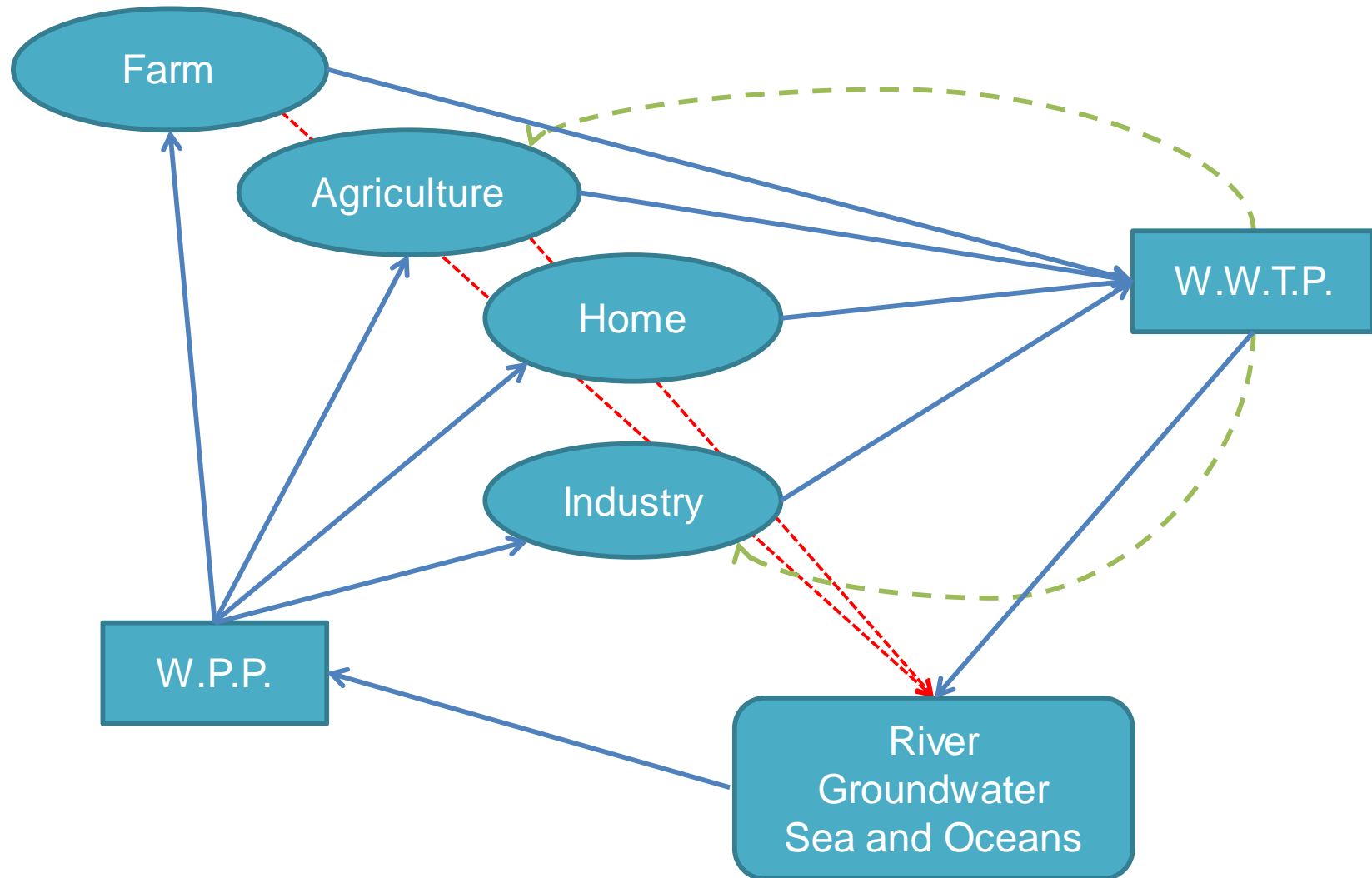


Sergio Santana Viera

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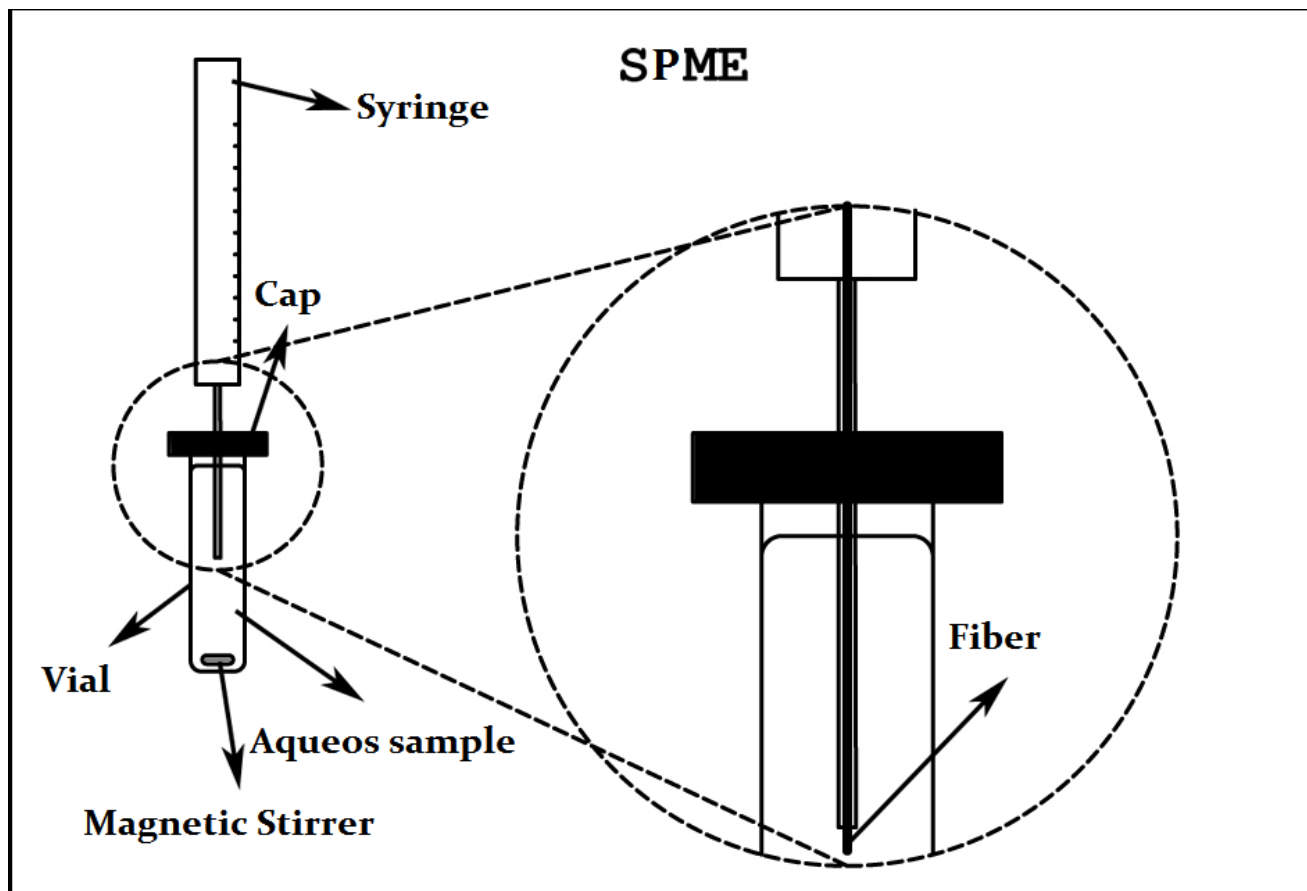
# The Water Cycle



# OBJECTIVE

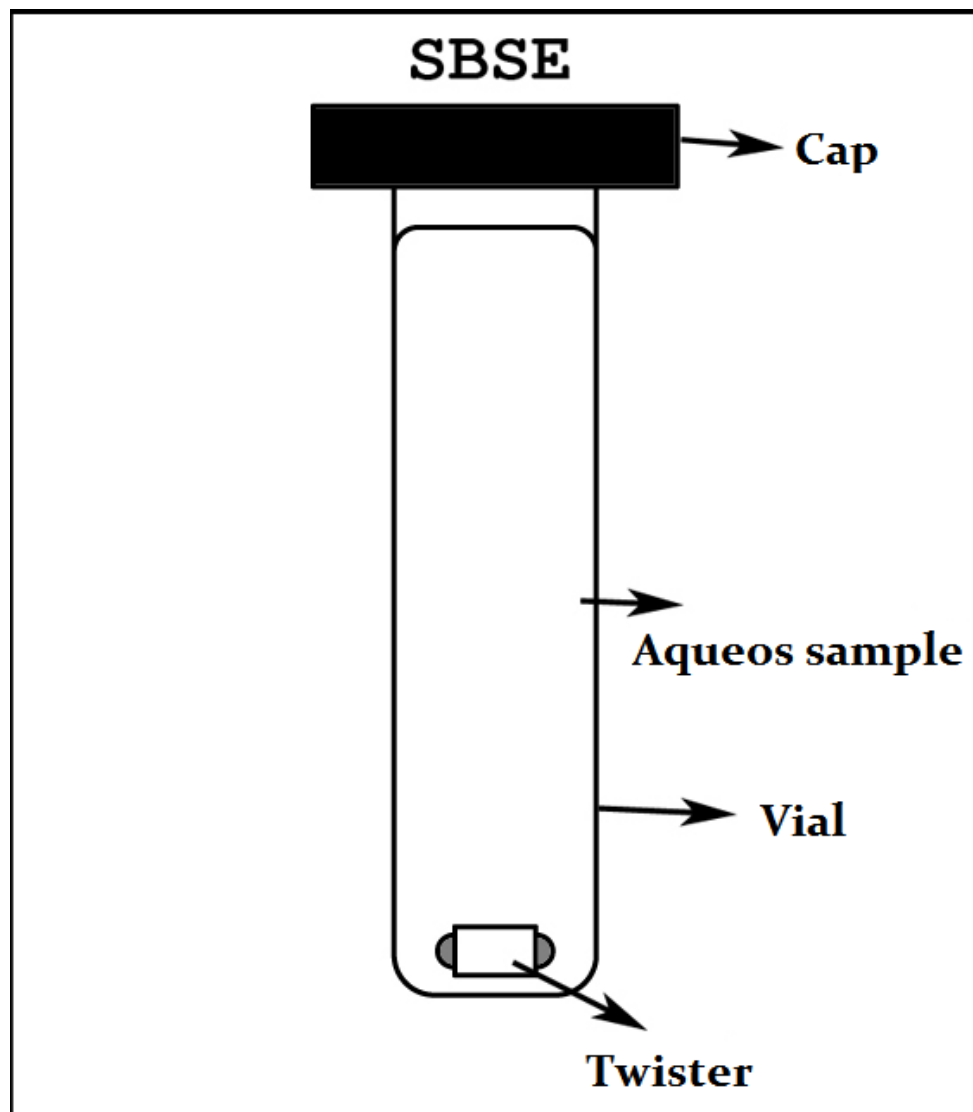
- Review the state of art of the microextraction techniques for liquid samples for the extraction and preconcentration of emerging contaminants.

# Solid Phase Microextraction (SPME)



- ❖ **Application:** analysis of perfluorinated compounds in surface and wastewater.

# Stir Bar Sorptive Extraction (SBSE)



- ❖ **Application:** analysis of polybrominated diphenyl ethers (PBDEs), nonilphenols, synthetic fragrances, estrogens

# Liquid Phase Microextraction (LPME)

- Quick.
  - Cheap.
  - It uses minimal volumes of solvent.
  - Allows higher preconcentration
- 
- It is generally between a small volume of a immiscible solvent in water and an aqueous phase containing the analytes of interest.

# Liquid Phase Microextraction (LPME)

Liquid Phase  
Microextraction  
(LPME)

- Single Drop  
Microextraction  
(SDME)

- Direct Immersion(DI-SDME)
- Liquid-liquid-liquid  
Microextraction (LLLME)
- Continuos Flow  
Microextraction (CFME)
- Headspace Microextraction  
(HS-SDME)

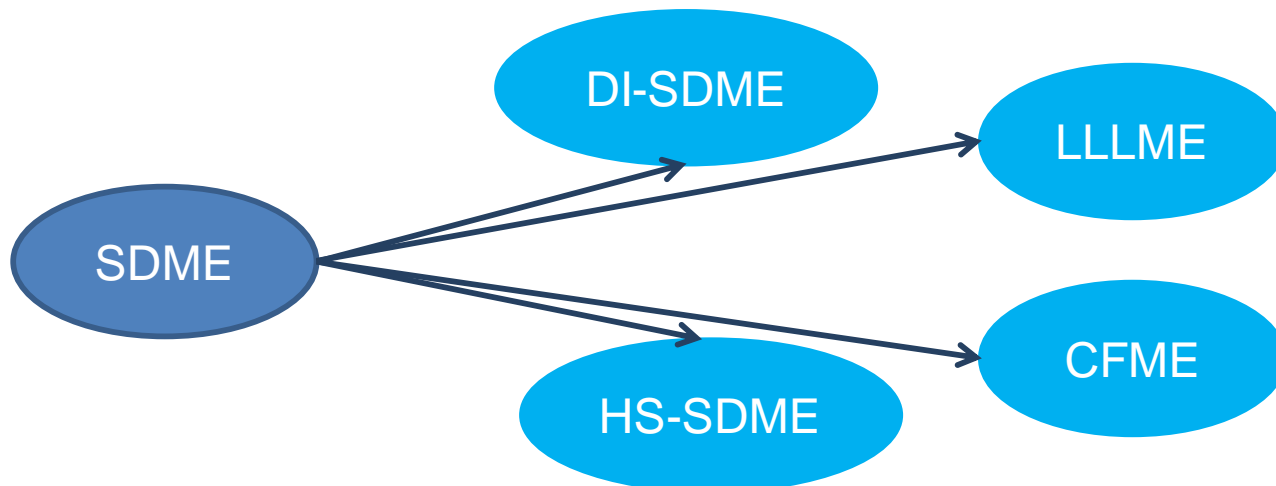
- Hollow Fiber Liquid Phase Microextraction (HF-LPME)
- Dispersive Liquid-Liquid Microextraction (DLLME)
- Directly-Suspended Droplet Microextraction (DSDME)
- Solid Drop Liquid Phase Microextraction (SD-LPME)



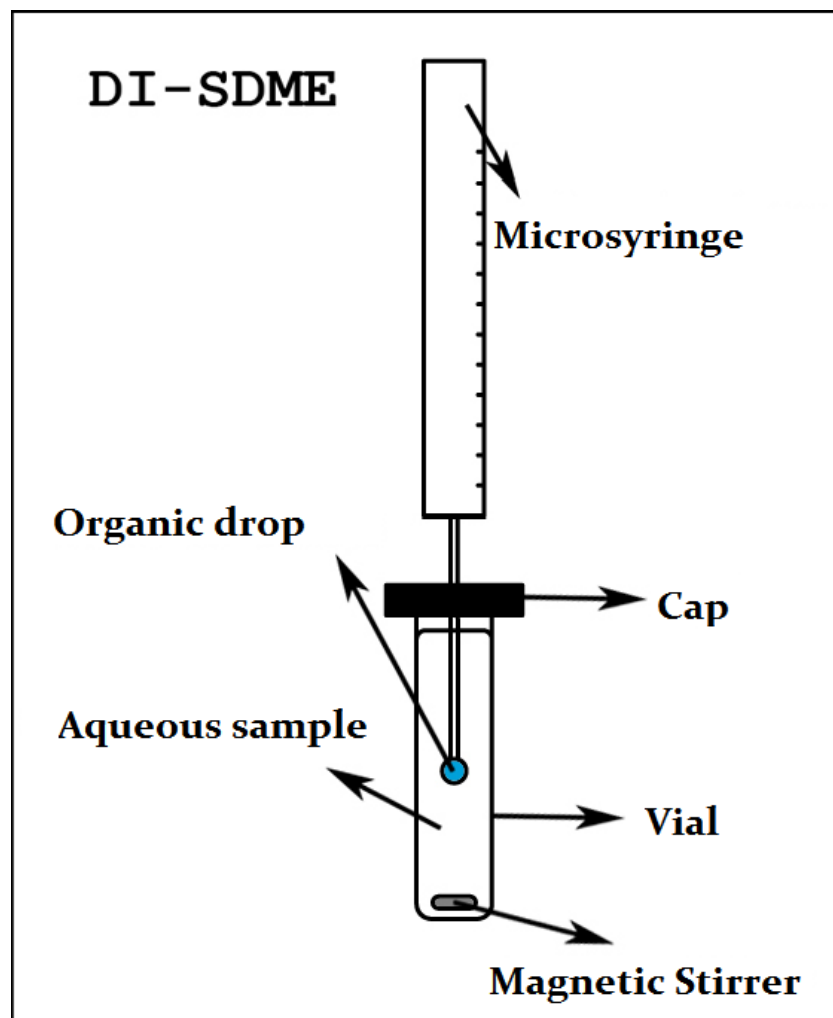
# Single Drop Microextraction (SDME)

- The extraction medium is a single drop.
- A drop of immiscible extracting solvent is suspended from a syringe into the medium.
- After extracting, the organic drop is retracted back into the microsyringe and is injected into the chromatographic system.

❖ **Application:** analysis of phthalate esters (PEs).

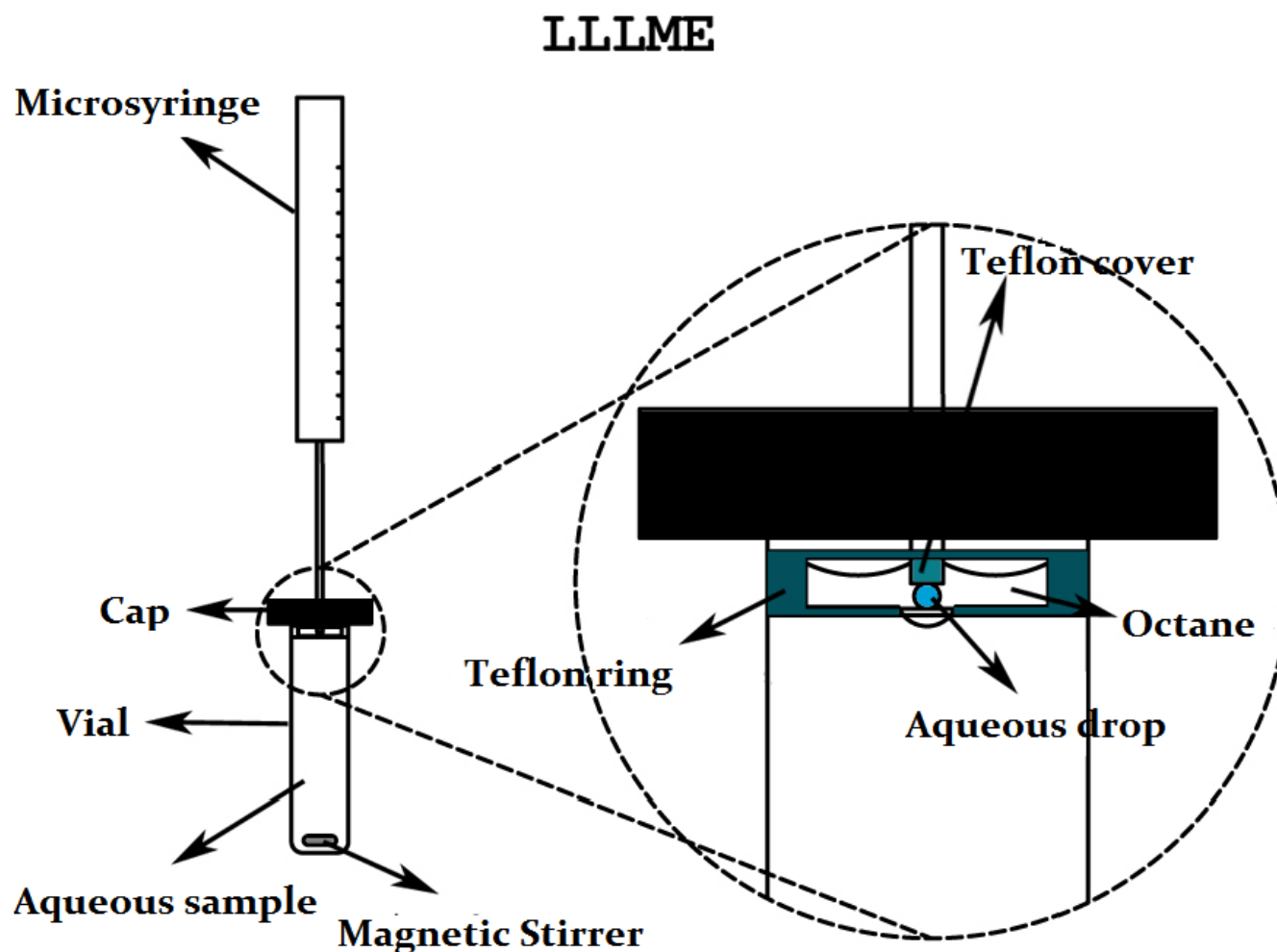


# Single Drop Microextraction (SDME)

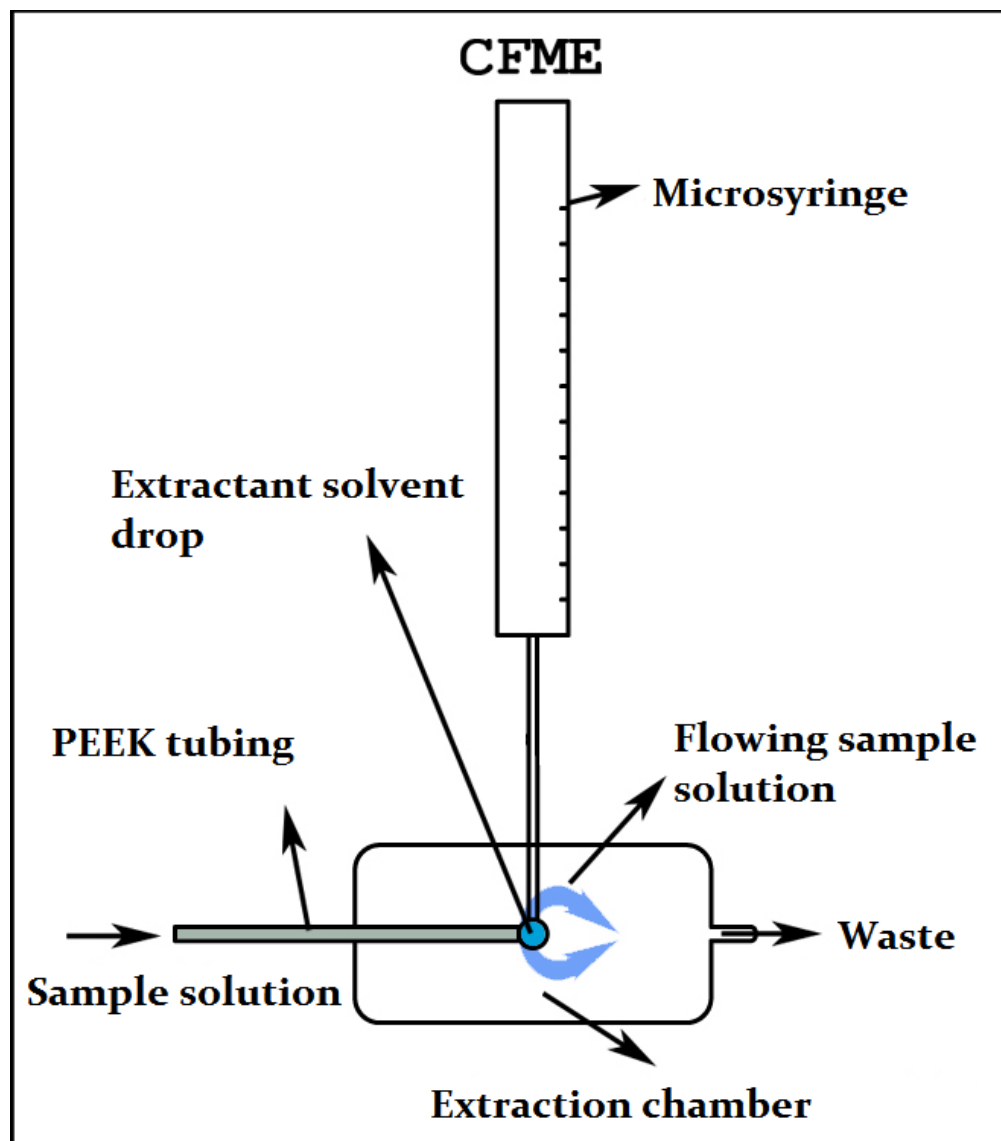


❖ **Application:** analysis of organophosphorus pesticide

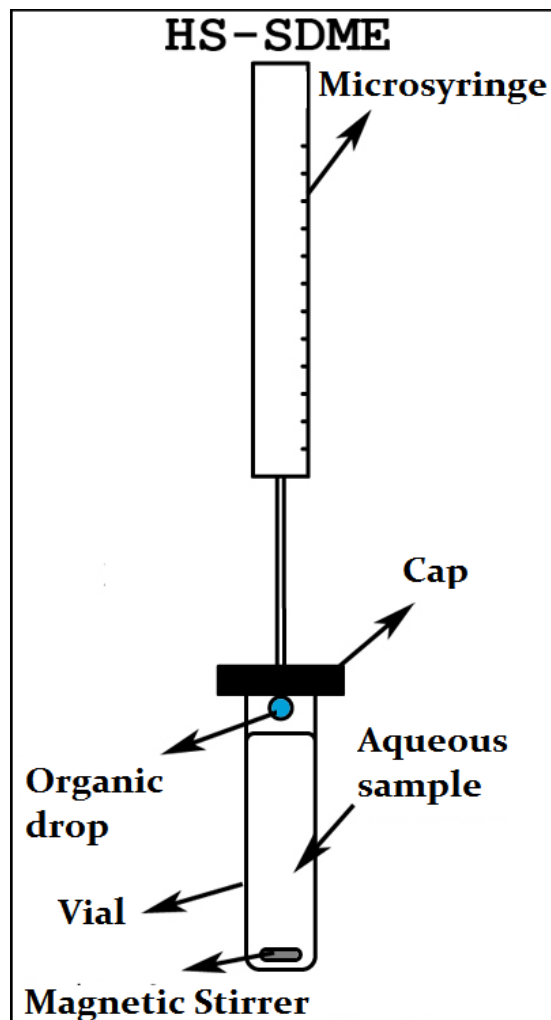
# Single Drop Microextraction (SDME)



# Single Drop Microextraction (SDME)

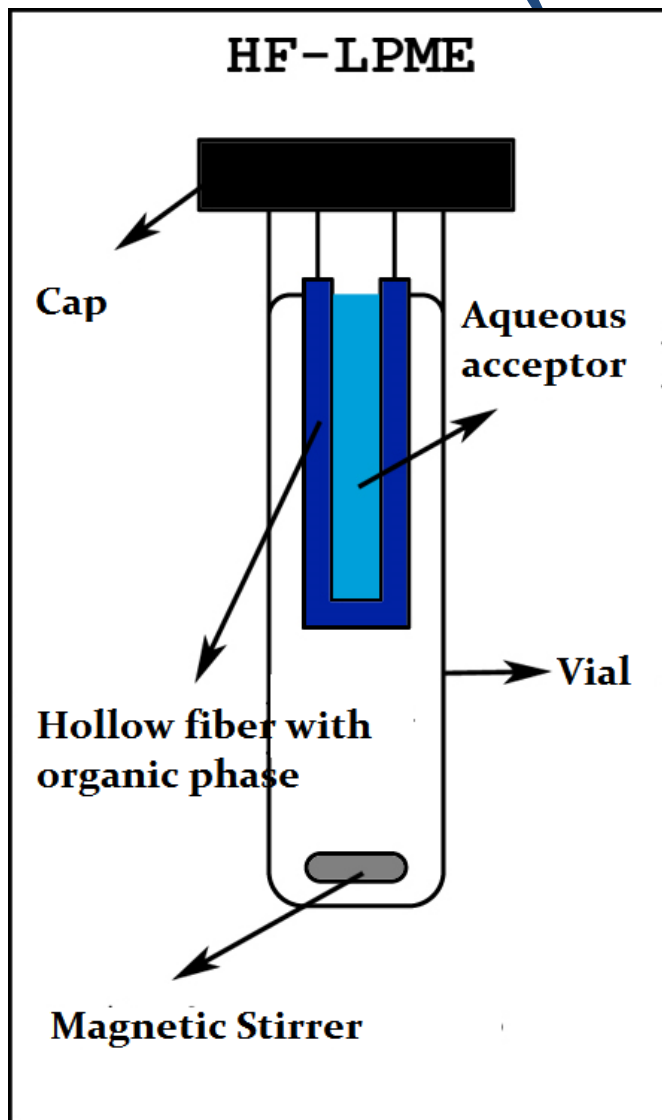


# Single Drop Microextraction (SDME)



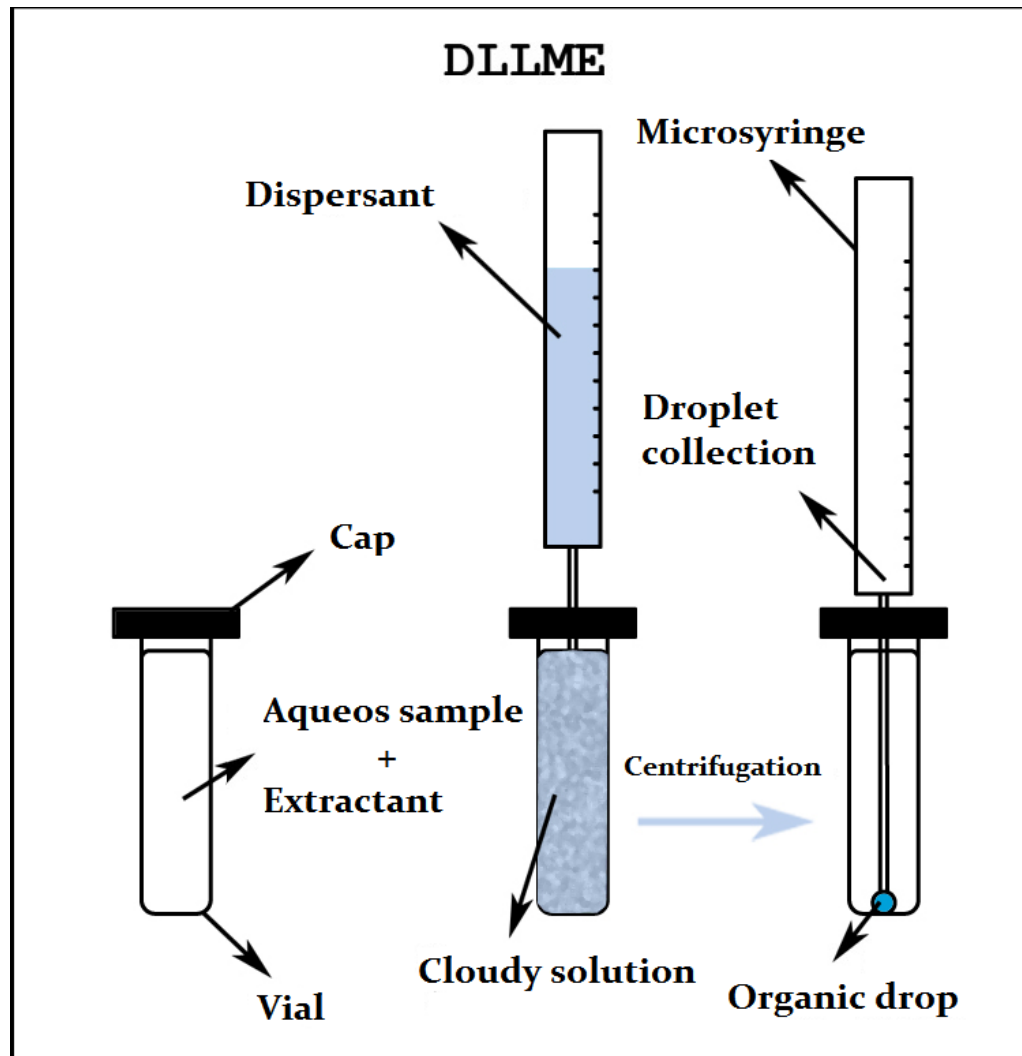
❖ **Application:** Analysis of Bisphenol A (BPA) in river water.

# Hollow Fiber Liquid Phase Microextraction (HF-LPME)



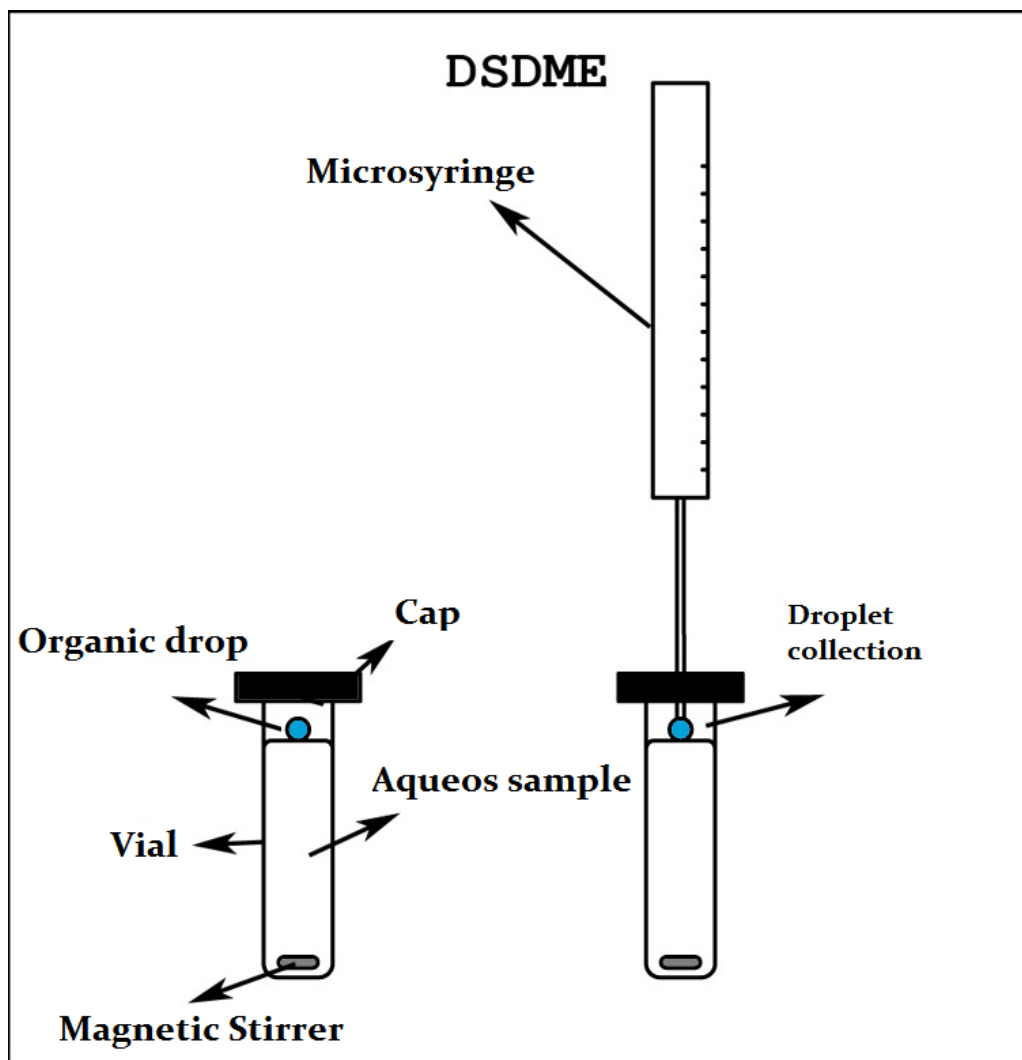
- ❖ **Application:** Analysis of flame retardants and pharmaceuticals.

# Dispersive Liquid-Liquid Microextraction (DLLME)



❖ **Applications:** surfactants, flame retardants, pharmaceuticals and personal care products.

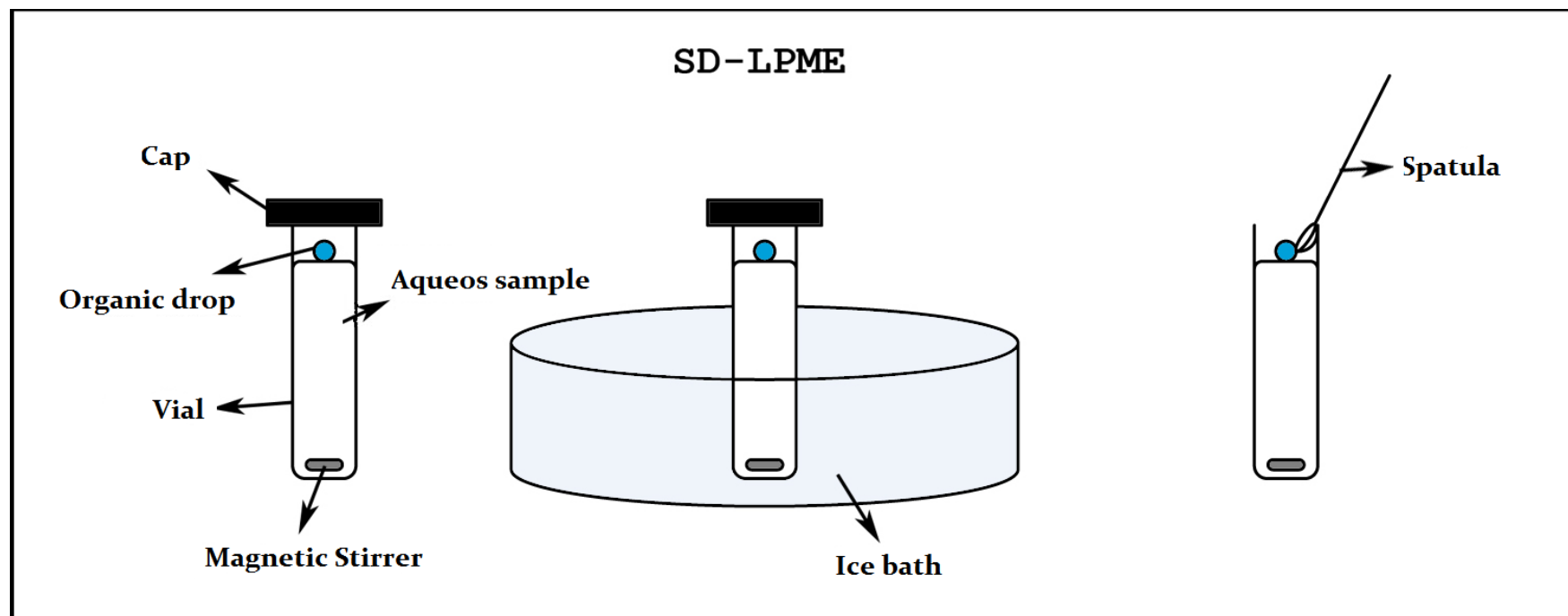
# Directly-Suspended Droplet Microextraction (DSDME)



❖ **Application:** Analysis of PBDEs and PEs.



# Solid-Drop Liquid-Phase Microextraction (SD-LPME)



- ❖ **Application:** polycyclic aromatic hydrocarbons (PAHs), Organochlorine pesticides, PEs

# Conclusions

- Classical techniques used for sample preparation (LLE and SPE), despite being the most employed techniques currently, have some limitations.
- Very powerful techniques, able to reach levels of up to tens or hundreds of ng / mL or ng / g.
- Normally, it is employed liquid or gas chromatography coupled to a mass spectrometer for the determination of the analytes.



# THANKS

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