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CFIS-ECOPHARMA: Innovative Continuous Flow Integrative Sampler for Pharmaceutical Compounds Detection

Passive samplers

Cost-effective alternative for the monitoring of the aquatic environment

Application in hydrosystems with micropollutant concentration variations

☺
- Time-weighted average concentrations
- Lower quantification limits
- Low logistical and technical costs
- Medium analytical cost
- Easy deployment in the field
- Better conservation of the sample

☹
- One average concentration
- Calibration needed
- No universal sampler
- Depends on exposure conditions

Continuous Flow Integrative Sampler

☺ Time-weighted average concentrations

Lower quantification limits

Low logistical cost

Medium technical and analytical costs

Easy deployment in the field

Better conservation of the sample

No calibration needed

Wide range of compounds

Independent from exposure conditions

Soluble and particulate fractions

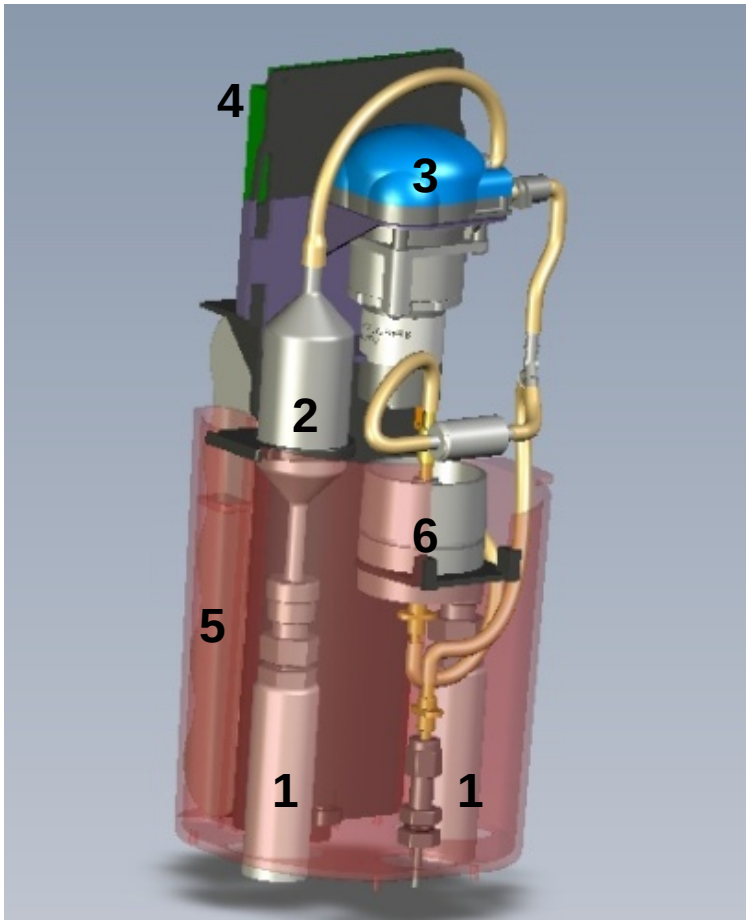
☹ One average concentration

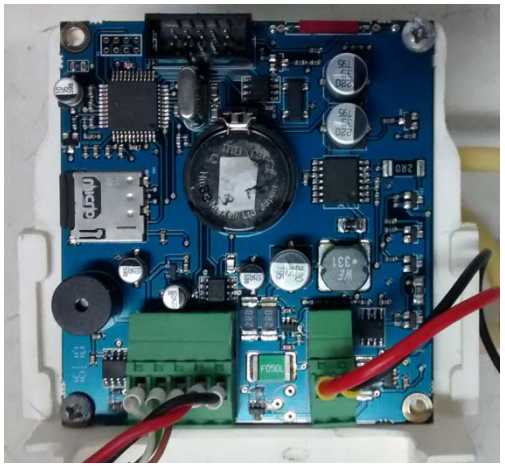
The CFIS

1. Filter and sleeve

2. Cell

3. Peristaltic pump





4. Electronic board

5. Battery

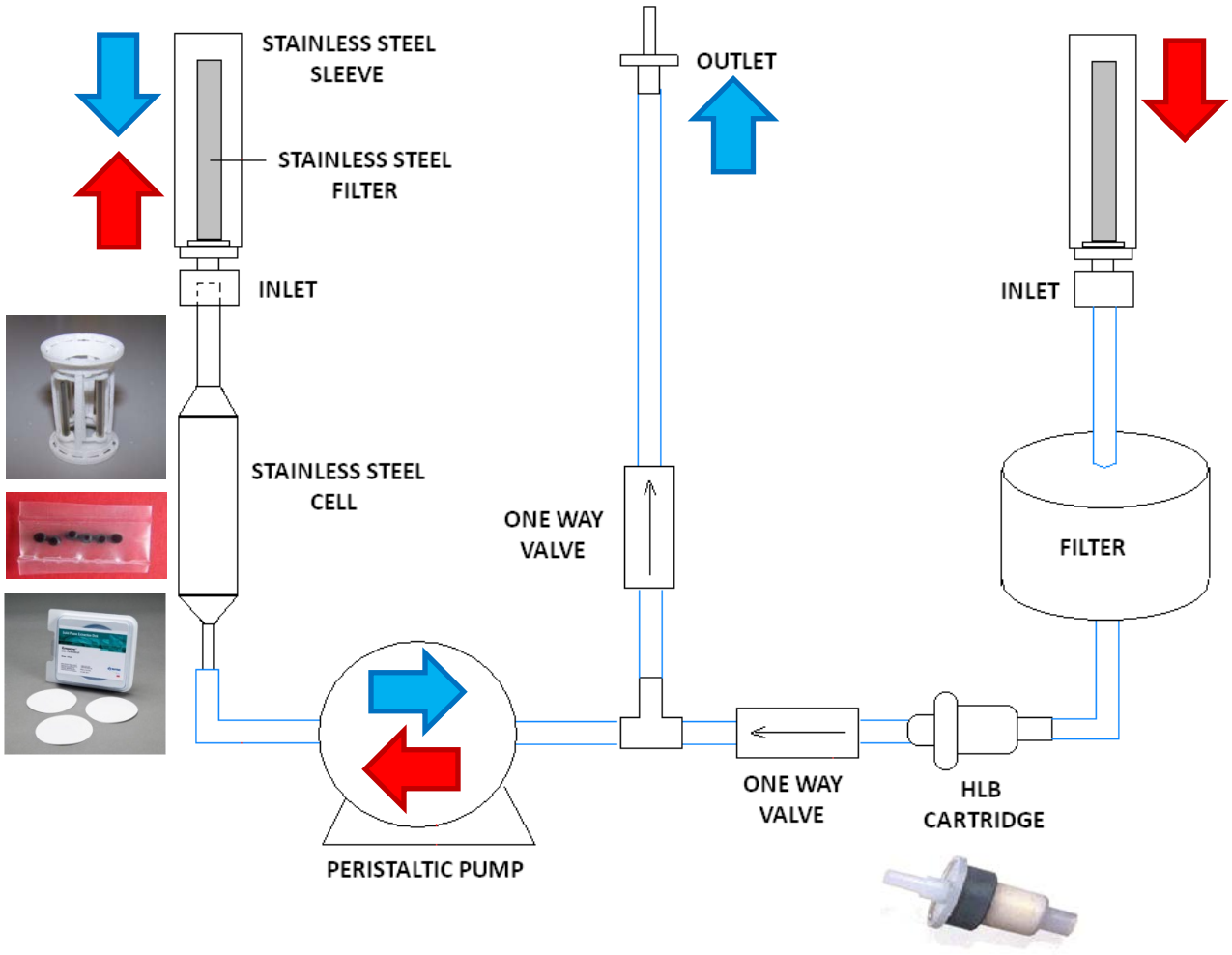
6. Filter

Wide range of compounds

Use of various sorbents

Gerstel Twisters®		Hydrophobic pesticides, PAHs, PCBs, PBDEs, Alkylphenols
Activated carbon/alginate beads		BTEX, THMs, other VOCs
Oasis® HLB cartridges		Polar pesticides, Pharmaceuticals, PFOS and PFOA
Empore® Discs		

CFIS configuration and operations



Continuous sampling

Alternating sampling

Flow rate
9 mL min^{-1}

Sampling duration
Up to 21 days

Types of water
- ✓Drinking water
- ✓Freshwater
- ✓Sea water
- ✓Wastewater

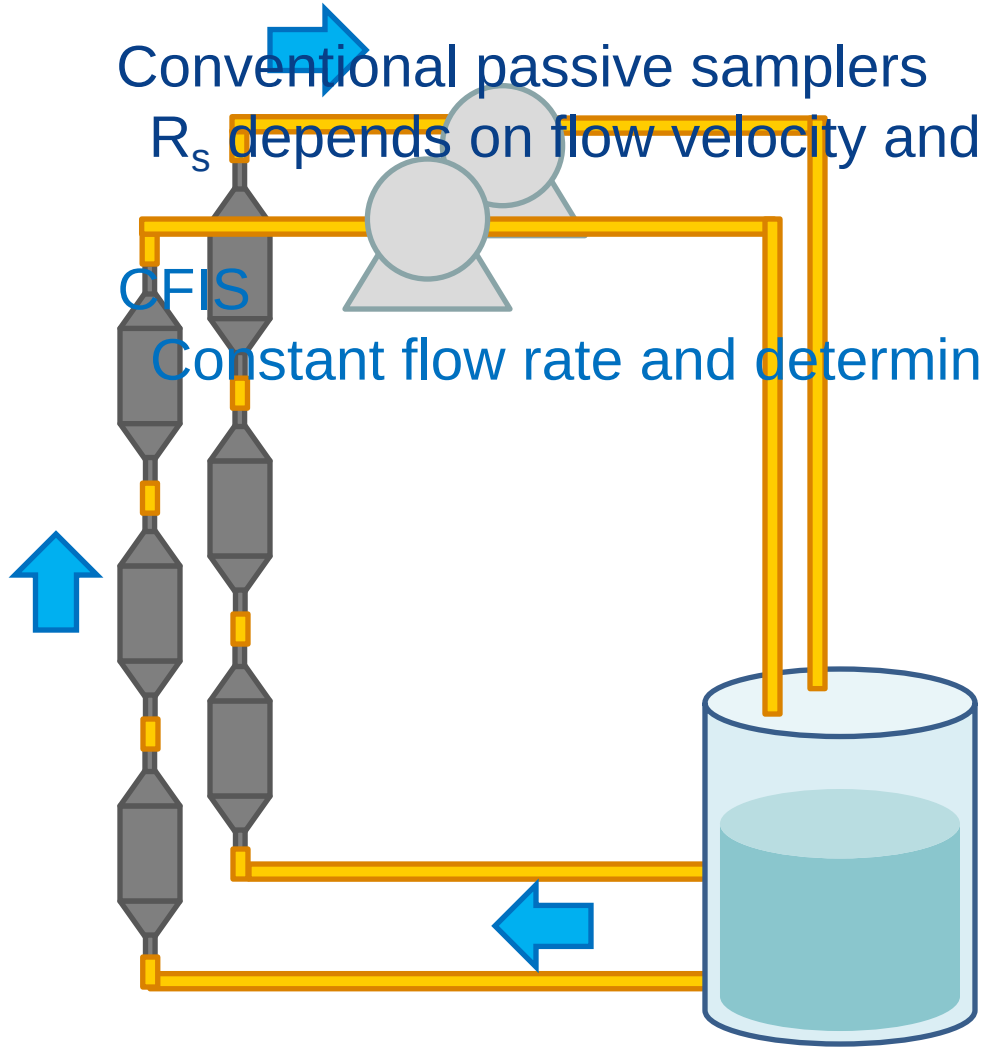
No dependence - No calibration

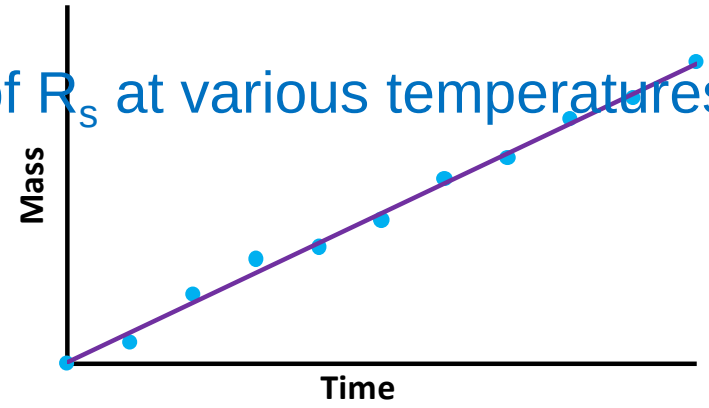
Conventional passive samplers

R_s depends on flow velocity and water temperature

CFIS

Constant flow rate and determination of R_s at various temperatures





Robust R_s

Representative and reliable average concentrations

Funded projects on passive sampling

Almost 10 years of R&D funded activities on passive sampling and the CFIS

Dates	Project (Funding organism)
2006-2007	Ministerio de Industria, Turismo y Comercio
2007-2008	Ministerio de Medio Ambiente
2007-2008	IMPIVA
2007-2008	Applus
2007-2011	CDTI
2009-2010	Ministerio de Medio Ambiente y medio rural y marino
2008-2010	Ministerio de Ciencia e Innovación (Instituto Español de Oceanografía)
2012-2015	AQUATIK (LIFE Programme)
2014-2015	DEMAGUA (FEDER - Innterconnecta)
2015-2016	CFIS-ECOPHARMA (FP7 - Eco-innovation)

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Co-funded by the Eco-innovation Initiative of the European Union

CFIS-ECOPHARMA

Innovative Continuous Flow Integrative Sampler for Pharmaceutical Compounds Detection

emalcsa

Fundación Ramón Domínguez I+D+i biosanitaria

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Ardtoe Marine Laboratory
Viking Fish Farms Ltd

aqua enviro limited

CETaqua
CENTRO TECNOLÓGICO DEL agua

Objectives

To obtain a more efficient and accurate sensor, the CFIS-ECOPHARMA, to sample Persistent Organic Pollutants (POPs), especially Pharmaceuticals and Personal Care Products (PPCPs) and pesticides in water

- R&D laboratory experiments
- Field monitoring campaigns

To scale-up and redesign **the CFIS for market uptake and commercialization**

Field exposure campaigns

3 sampling sites, involving 3 project partners

- Ardtoe Marine Laboratory: Sea water

Sampling campaigns of 10 days for a year. Started on July 2015

- EMALCSA: Surface water and drinking water

3 sampling campaigns of 21 days. September 2015, March 2016, June 2016

- Fundación Ramón Domínguez: Hospital wastewater

3 x 2 sampling campaigns of 6 days. September 2015, March 2016, June 2016

Common project compounds

- Carbamazepine, diclofenac, ketoprofen, trimethoprim, erythromycin, roxithromycin, sulfamethoxazole
- Estrone, 17-β-estradiol, 17-α-ethinylestradiol, estriol

Specific compounds

- Pharmaceuticals, pesticides, organochlorine pesticides, PCB, PAH, PBDE, alkylphenols, VOC

Pre-announcement: May 11th in Barcelona

- Regulation of emerging compounds
- Monitoring in European water bodies
- Passive sampling: background and new trends
- CFIS-ECOPHARMA project: presentation and results

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More information:

YouTube

www.cfis-ecopharma.com

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Thank you!