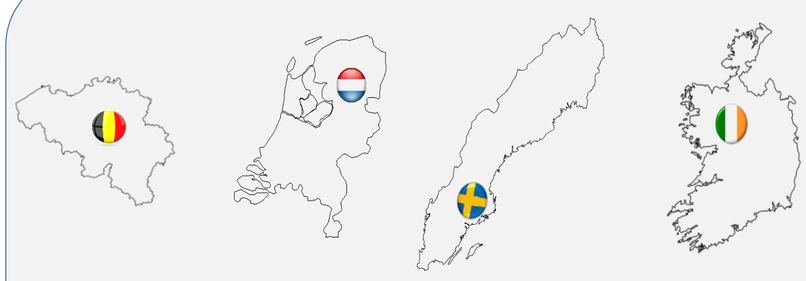
SUSPECT SCREENING ANALYSIS IN INDOOR DUST & AIR FROM HOMES, OFFICES AND PRE-SCHOOLS USING LC-QTOF-MS

Christina Christia[1*], Giulia Poma[1], Stuart Harrad[2], Cynthia de Wit[3], Pim Leonards[4], Marja Lamoree[4], Adrian Covaci[1*]

[1]Toxicological Center, University of Antwerp, Universiteitsplein 1, B-2610 Wilrijk, Belgium
[2]School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, West Midlands, United Kingdom
[3]Department of Environmental Science and Analytical Chemistry (ACES), Stockholm University, SE-106 91 Stockholm, Sweden
[4]Institute for Environmental Studies (IVM), VU University Amsterdam, De Boelelaan 1087, 1081 HV, Amsterdam, The Netherlands
*** christina.christia@uantwerpen.be**

Background



B17 SHINE: Target & Non-target Screening of cHemicals in the Indoor enviroNment for human Exposure assessment

- Indoor environment is a **complex and major contributor** to long term human exposure to chemicals[1,2].
- Thousands of chemicals are present in indoor dust and air due to their **additive use in products & emission from indoor activities**[3].
- **Targeted analytical methods** have provided critical information on legacy and emerging chemicals[4].
- Development of **untargeted/suspect** analytical methods is becoming the key tool for the investigation of the "**unknowns**"(alternatives, emerging, novel chemicals)[2].

Approach

Sampling Methods

Sample Collection

- Dust from homes (*n=7*), offices (*n=4*), preschools (*n=2*)
- Air from offices (*n=4*) were collected (2016-'17).

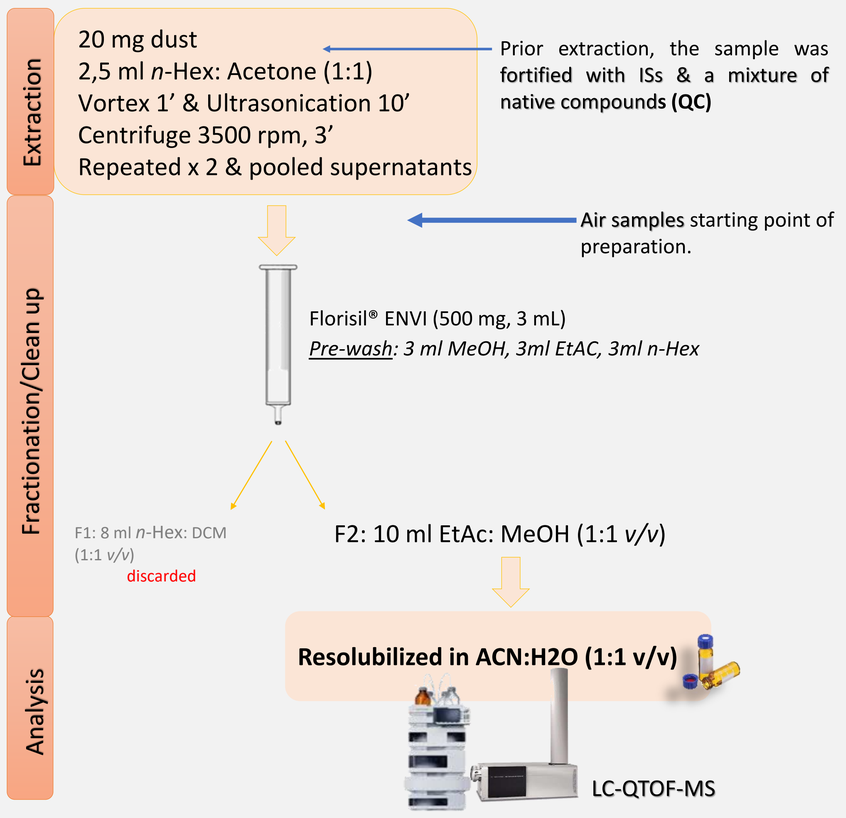
Dust Sampling methods

- Vacuum cleaner equipped with a nylon sock (25 µm pore size). 1m^2 of carpet was vacuumed for 2'/ 4m^2 of bare floor for 4'.
- Vacuum cleaner equipped with nozzle (polypropylene) and an inserted metal filter

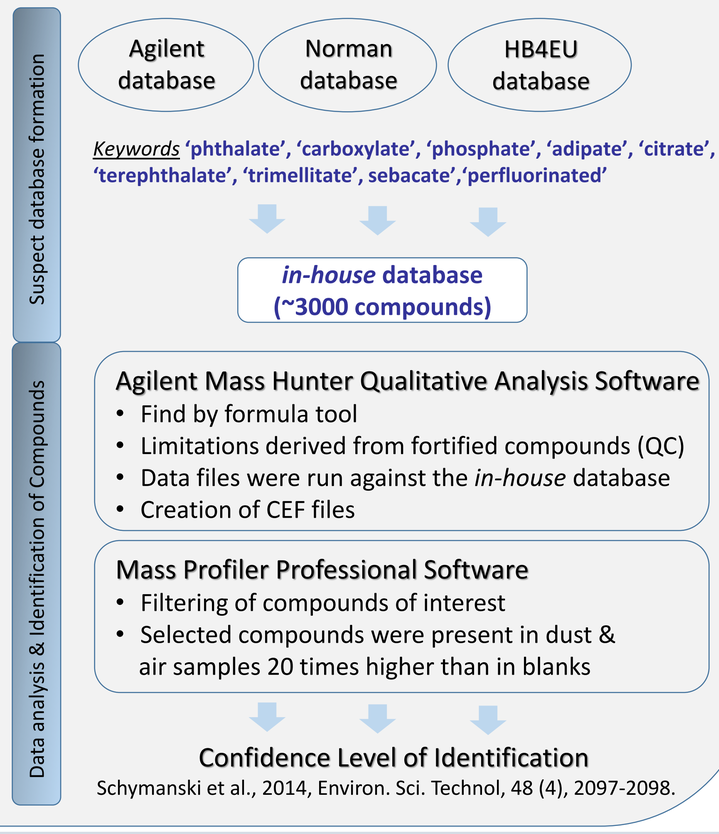
Air Sampling method

- Pumps equipped with absorbents (PUFs, GFFs, Env+ Cartridges) were deployed.

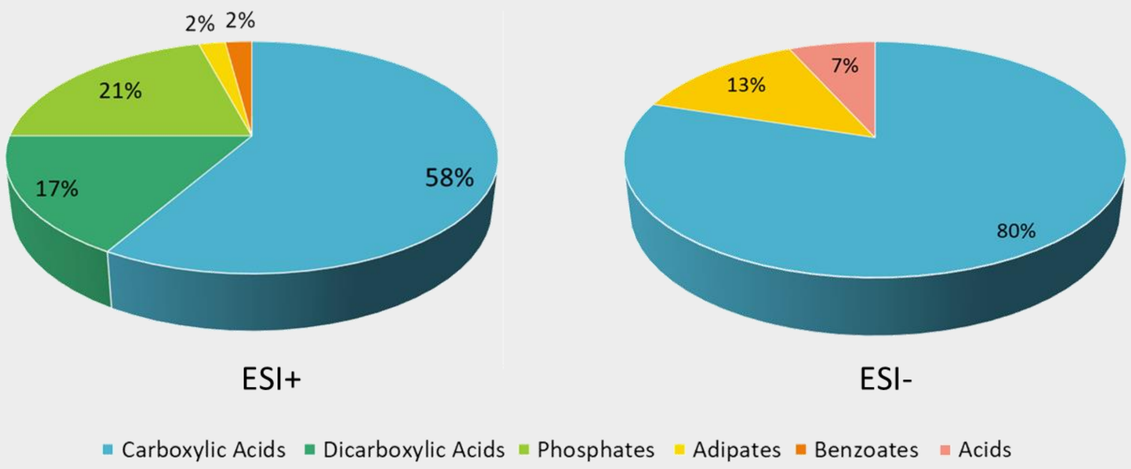
Sample Preparation Protocol



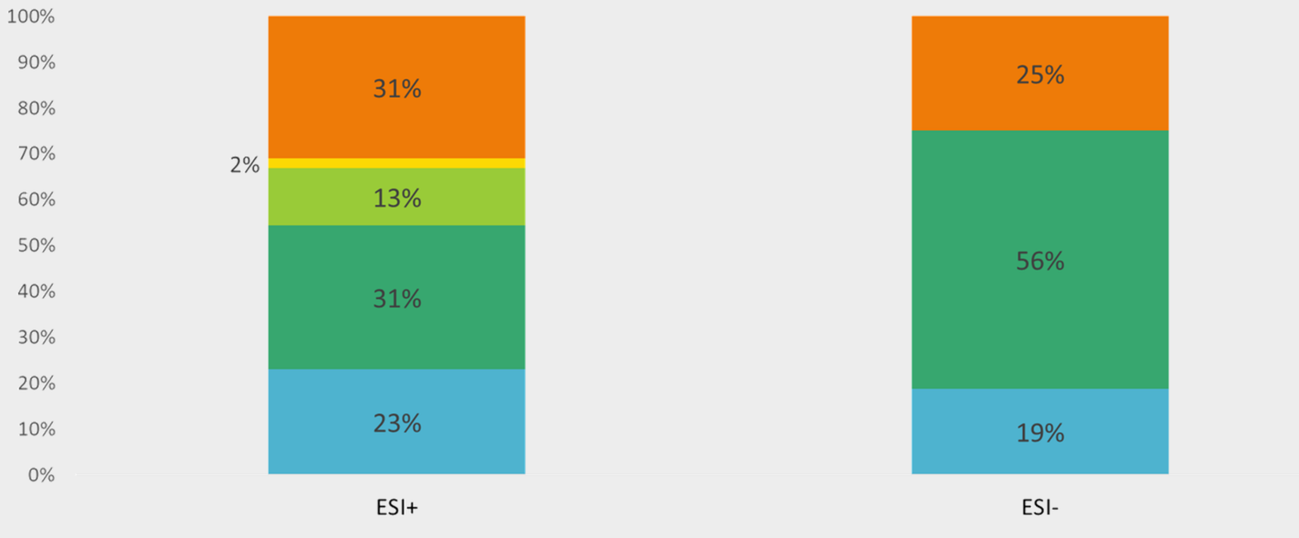
Workflow Development



Results



Graph 1. Contribution of compound groups found in ESI+ and ESI- ionization mode.



*materials; polymers, resins, films, cements, sheets, n.a.; not available

Graph 2. Applications of compounds identified in ESI+, ESI- mode.

- The fortified ISs were found in 100% samples.
- Native compounds were found in samples ranging 24-100% with confidence level of identification 1.
- Most positive hits were detected in dust (level of identification 3).
- Dominant compounds were carboxylic acids in both ionization modes.
- Drugs and personal care products were the major application categories of the identified compounds.

Conclusions

- ↘ Sample preparation protocol & data analysis workflow were developed and applied successfully.
- ↘ **Level of Identification 1** was achieved for all known native standards.
- ↘ **ESI+:** 49 compounds were identified with 89% detection frequency in samples.
- ↘ **ESI-:** 16 compounds were identified with 15-20% frequency detection in samples.
- ↘ Dust contained the majority of identified compounds compared to air samples.
- ↘ Additives of drugs and personal care products were mostly identified in dust and air.

References

1) Dong et al., 2019. Environ. Sci. & Technol., 53, 7045-7054., **2)**Cefic-LRI Programme, European Chemical Industry Council, cefic-lri.org **3)**Dionisio et al., 2015. Toxicology reports, 2, 228-237. **4)** Christia et al., 2018, Environ. Res., 171, 204-212.

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