

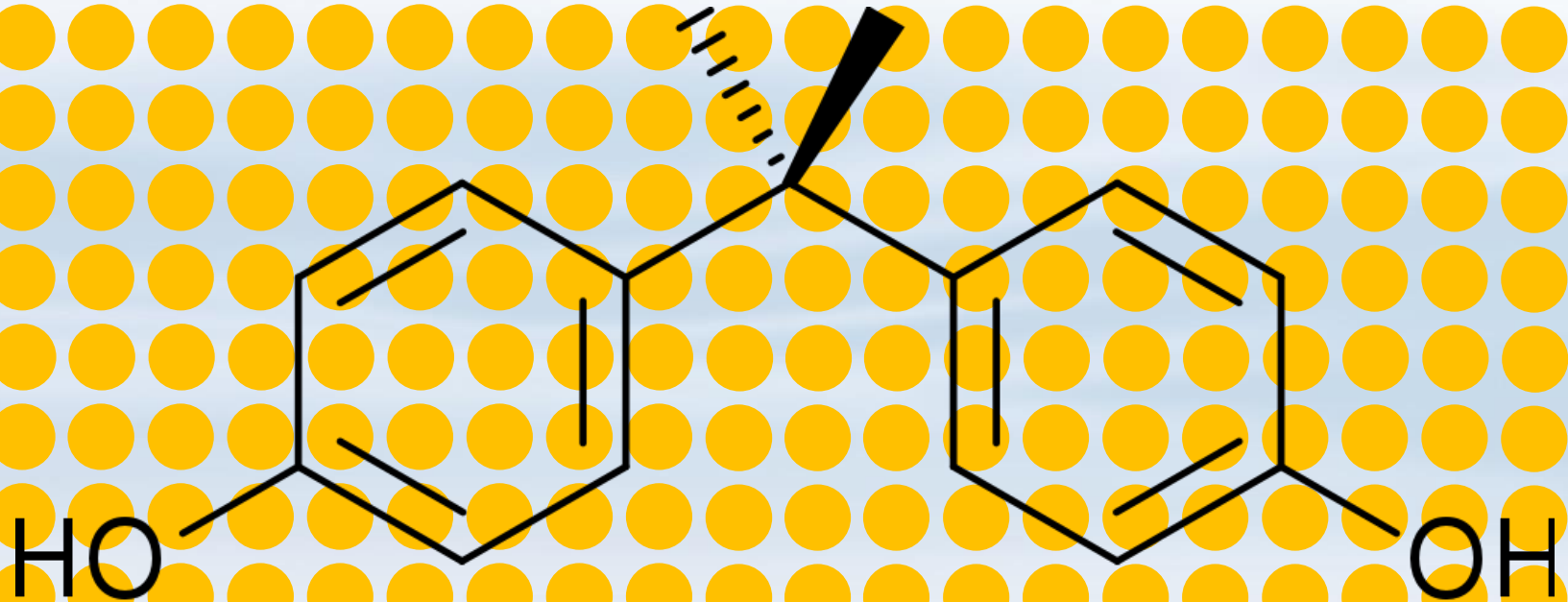
Plastic chemicals: A short trip to an undiscovered land

Martin Wagner

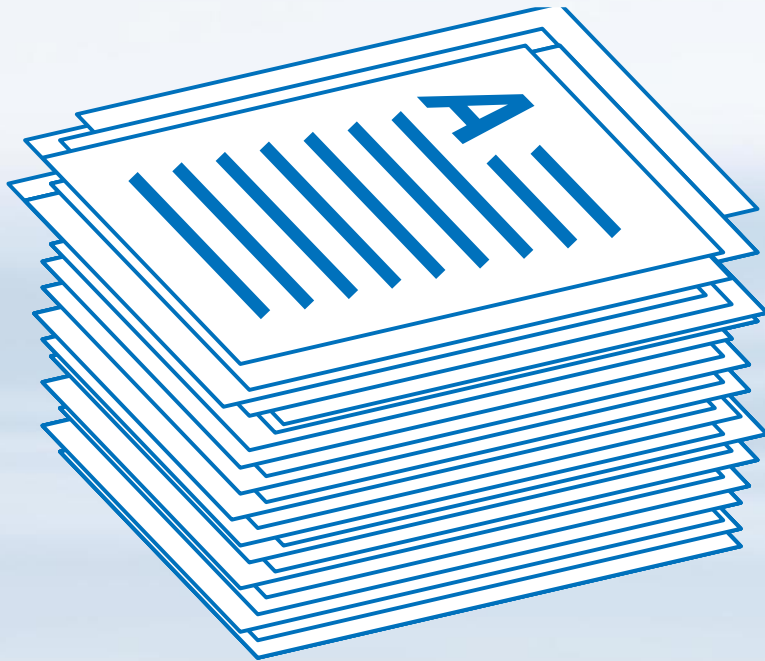
ENVITOX group, Department of Biology
NTNU Trondheim, Norway



The notorious Bisphenol A



The notorious Bisphenol A



n = 30,208

associated with

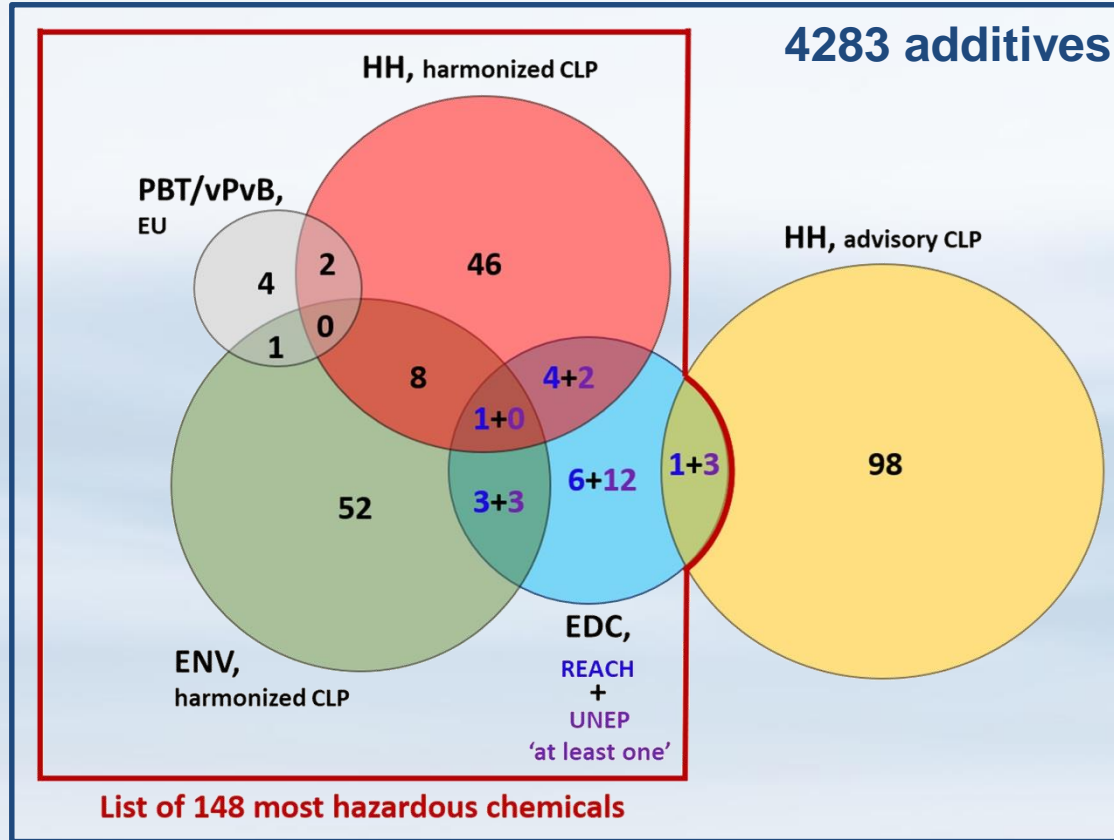
- reproductive disorders
- metabolic disorders
- behavioral disorders
- coronary heart diseases
- cancer

health care costs

- \$ 3 bn p.a. (US, 2008)
- € 1.5 bn (EU, lifetime costs)

(Vandenberg et al., 2007, Repr. Toxicol., Trasande et al. 2014, Heath Affairs, Trasande et al. 2015, J. Clin. Endocr. Metabol.)





(Groh et al., 2019, STOTEN)

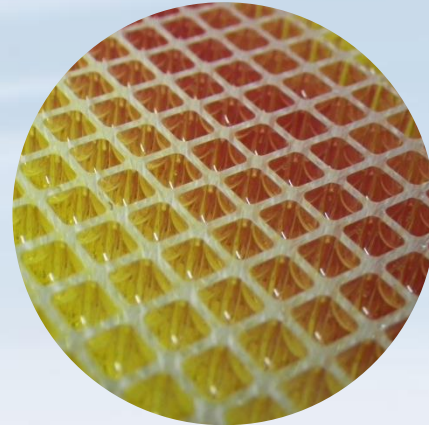
Plastic chemicals: More than additives

Intentionally added substances (IAS)

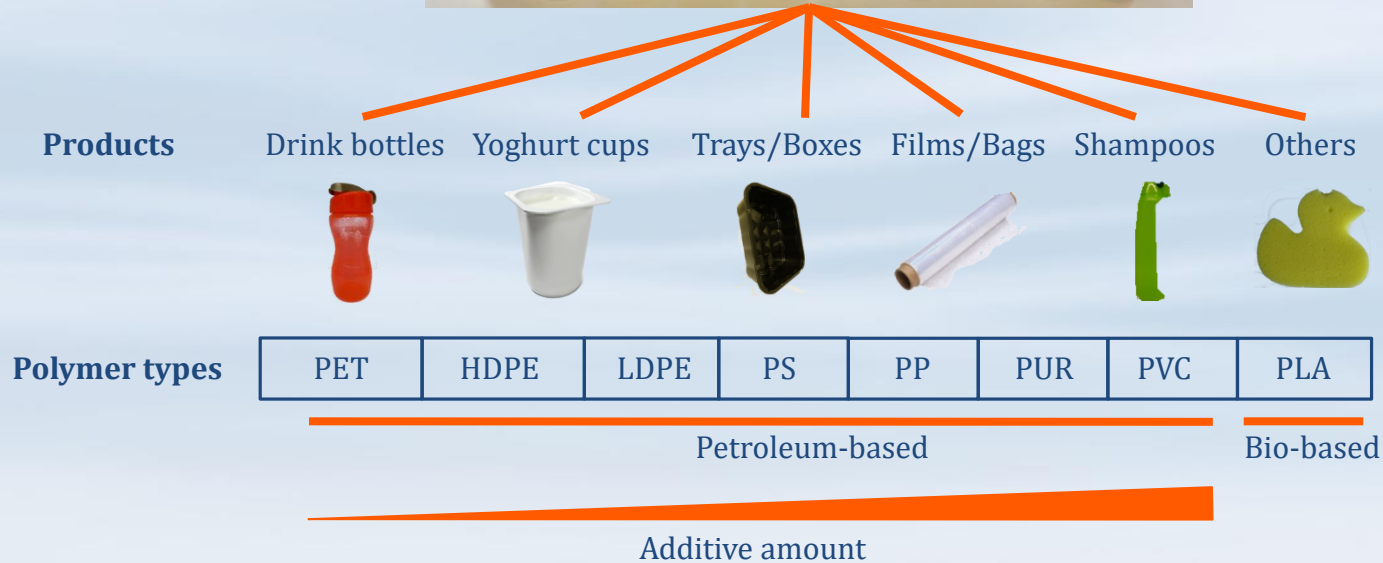
- starting substances
- catalysts
- additives

Non-intentionally added substances (NIAS)

- impurities
- reaction by-products
- degradation products

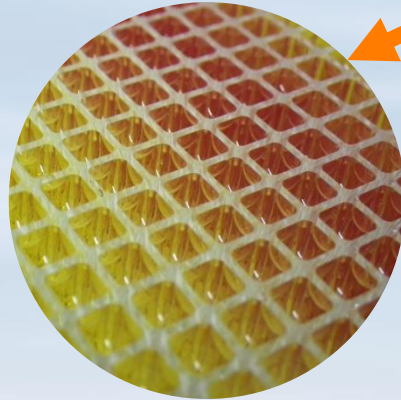


Toxicity and chemical composition of plastics



(Zimmermann et al., 2019, ES&T)

Toxicity and chemical composition of plastics



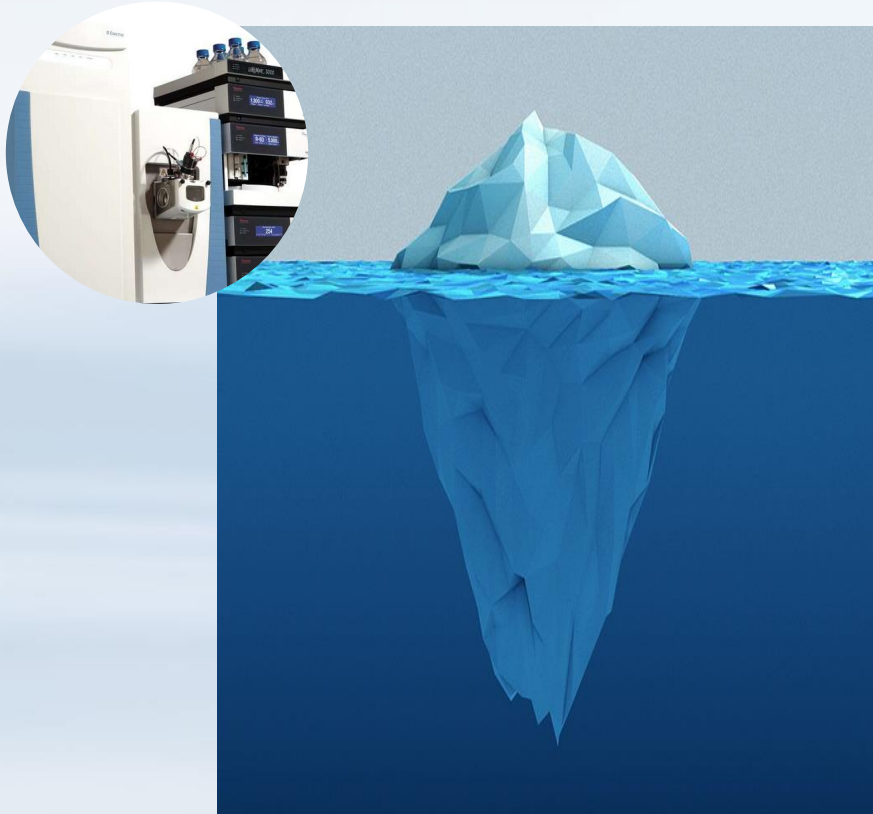
baseline toxicity
oxidative stress
estrogenicity
antiandrogenicity

non-target GC-
QTOF-MS



(Zimmermann et al., 2019, ES&T)

Plastic chemicals: non-target analysis



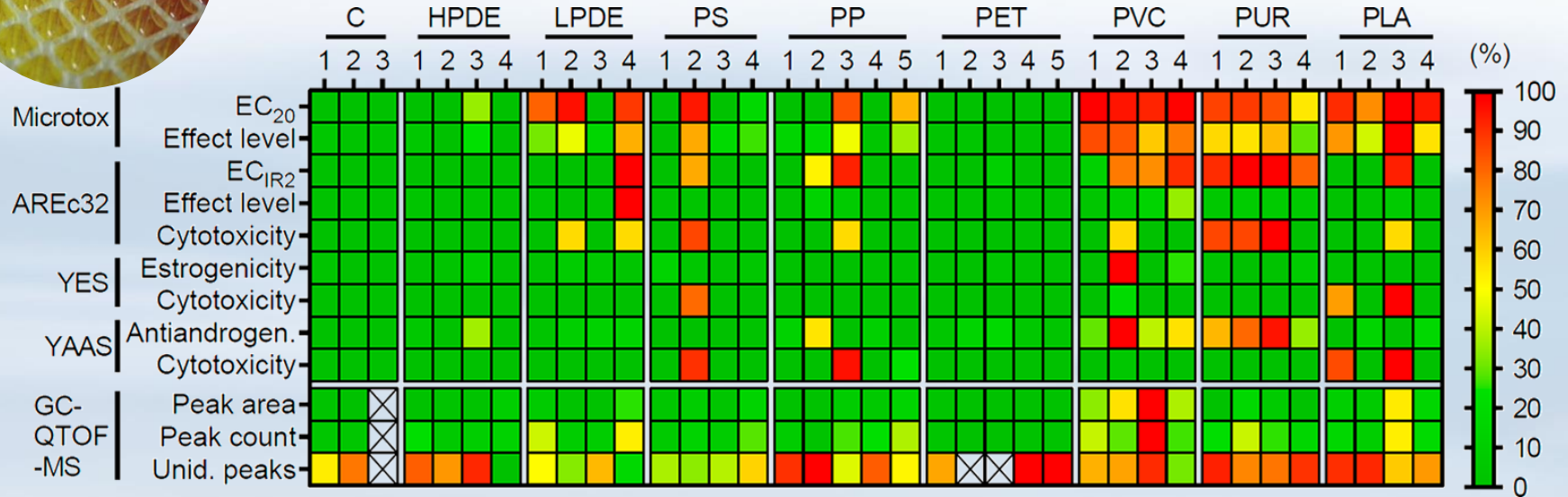
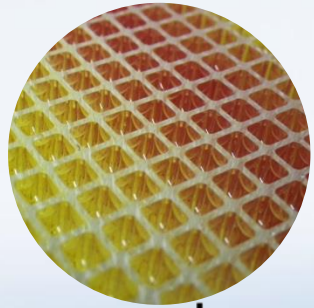
260 tentatively identified

**50 IAS
7 NIAS**

1411 chemical features

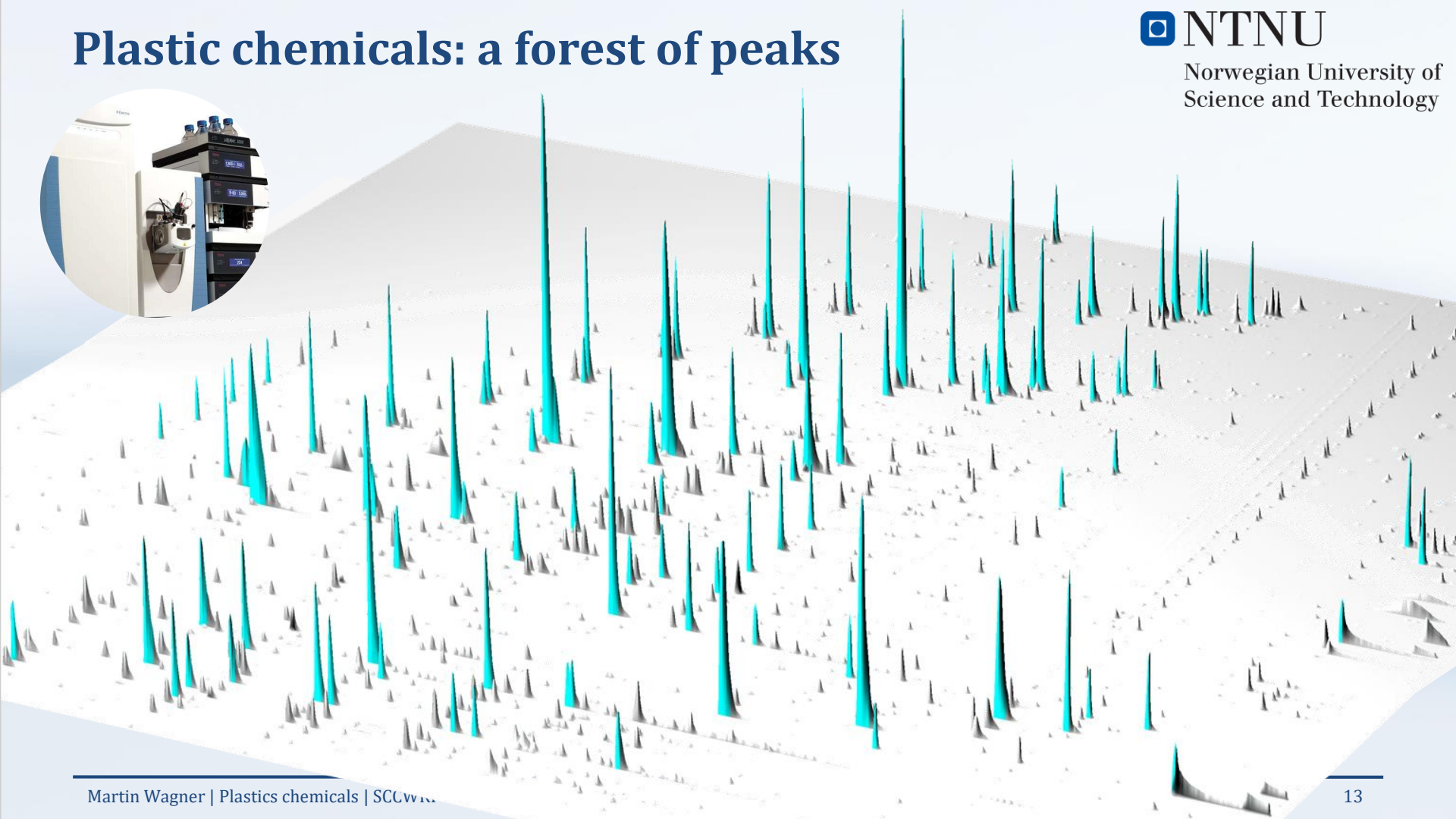
(Zimmermann et al., 2019, ES&T)

Conventional plastics: *in vitro* toxicity

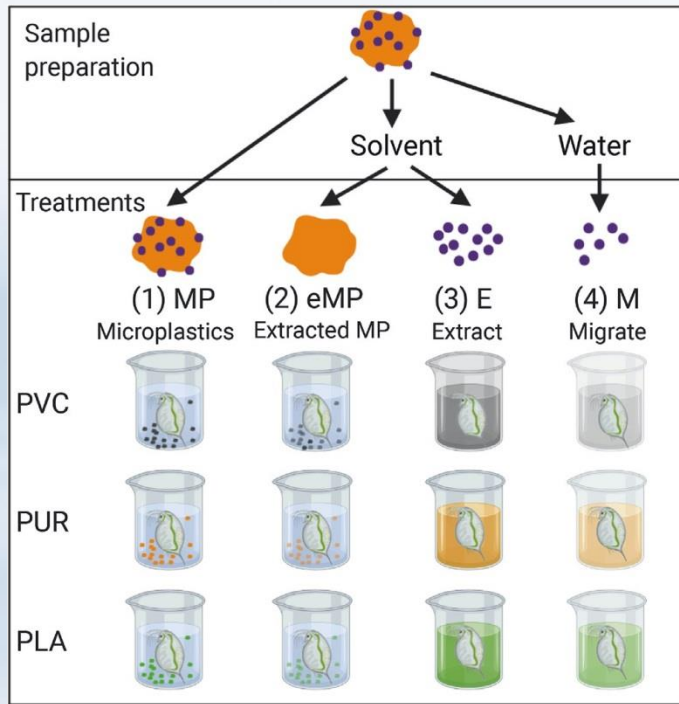


(Zimmermann et al., 2019, ES&T)

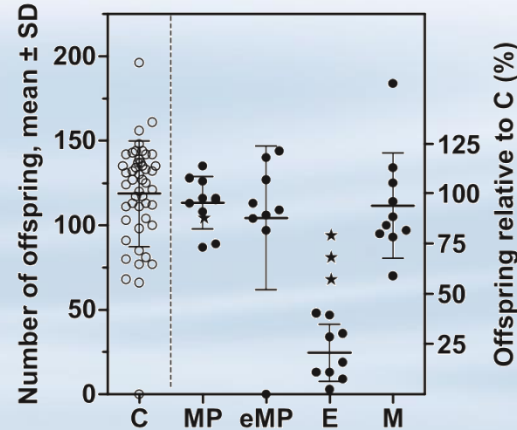
Plastic chemicals: a forest of peaks



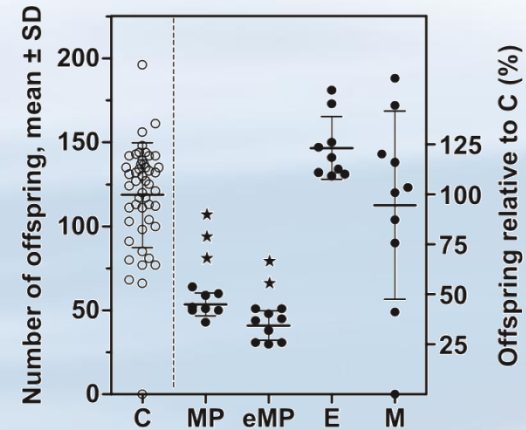
Microplastics: chemical vs particle toxicity



A (PVC)



B (PUR)



(Zimmermann et al., 2020, Environ. Pollut.)





Bundesministerium
für Bildung
und Forschung



Forskningsrådet



EUROPEAN UNION

