

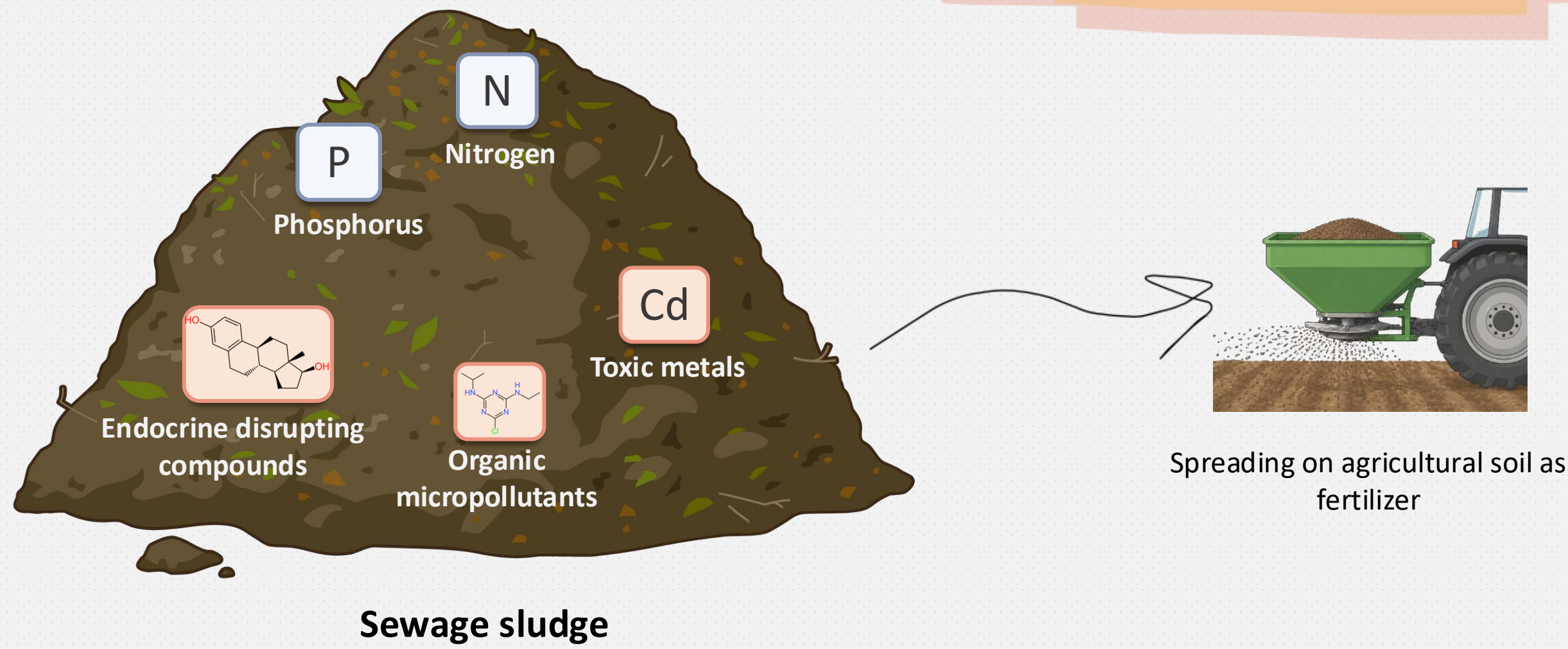
# Assessing wastewater and sludge treatment efficiency

## by combining physicochemical characterization and *in vivo* bioassays

Sara Cvetković<sup>1</sup>, Erika Sinisgalli<sup>2</sup>, Anne-Sophie Permal<sup>3</sup>, Rania Krimou<sup>3</sup>, Sabrina Guérin<sup>3</sup>, Gregory Lemkine<sup>1</sup>, Dominique Patureau<sup>2</sup>, David Du Pasquier<sup>1</sup>

<sup>1</sup> Laboratoire Watchfrog S.A., 1 rue Pierre Fontaine, 91000 Evry, France; <sup>2</sup> INRAE, Univ Montpellier, LBE, 102 Av. des Etangs, 11100, Narbonne, France; <sup>3</sup> Syndicat Interdépartemental pour l'Assainissement de l'Agglomération Parisienne (SIAAP), 82 avenue Kleber, 92700 Colombes

### Problem



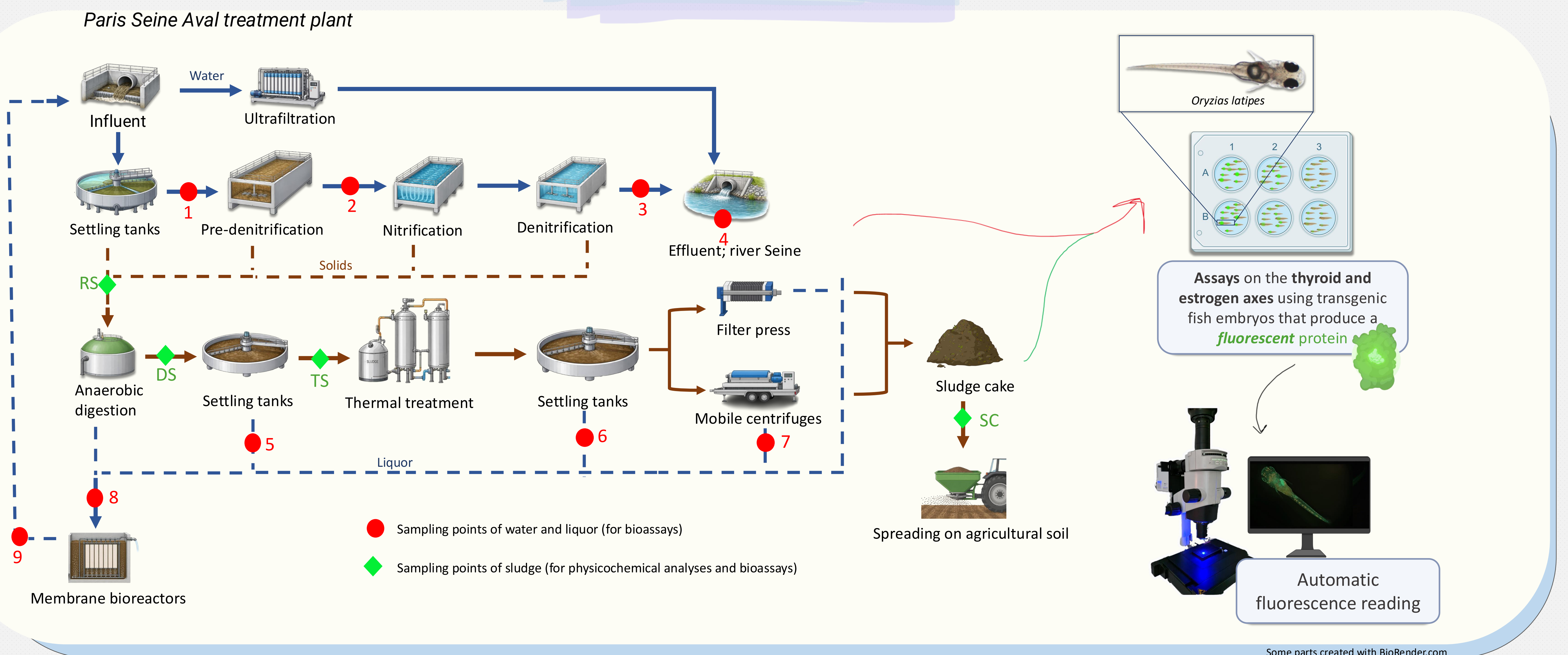
### Goals of our study

- Investigate the **endocrine disruption activity** of *wastewater*, *sludge*, and *liquor samples* from a wastewater treatment plant;
- Identify treatment processes that effectively reduce endocrine activity of the samples;
- Monitor the variability** of endocrine activity within a season and between seasons;
- Evaluate how treatment strategies affect **agronomic value** of sludge;
- Assess the **fate** and residual levels of organic and inorganic **contaminants**;
- Develop a **multicriteria approach** to evaluate benefits and environmental risks of treated sludge.

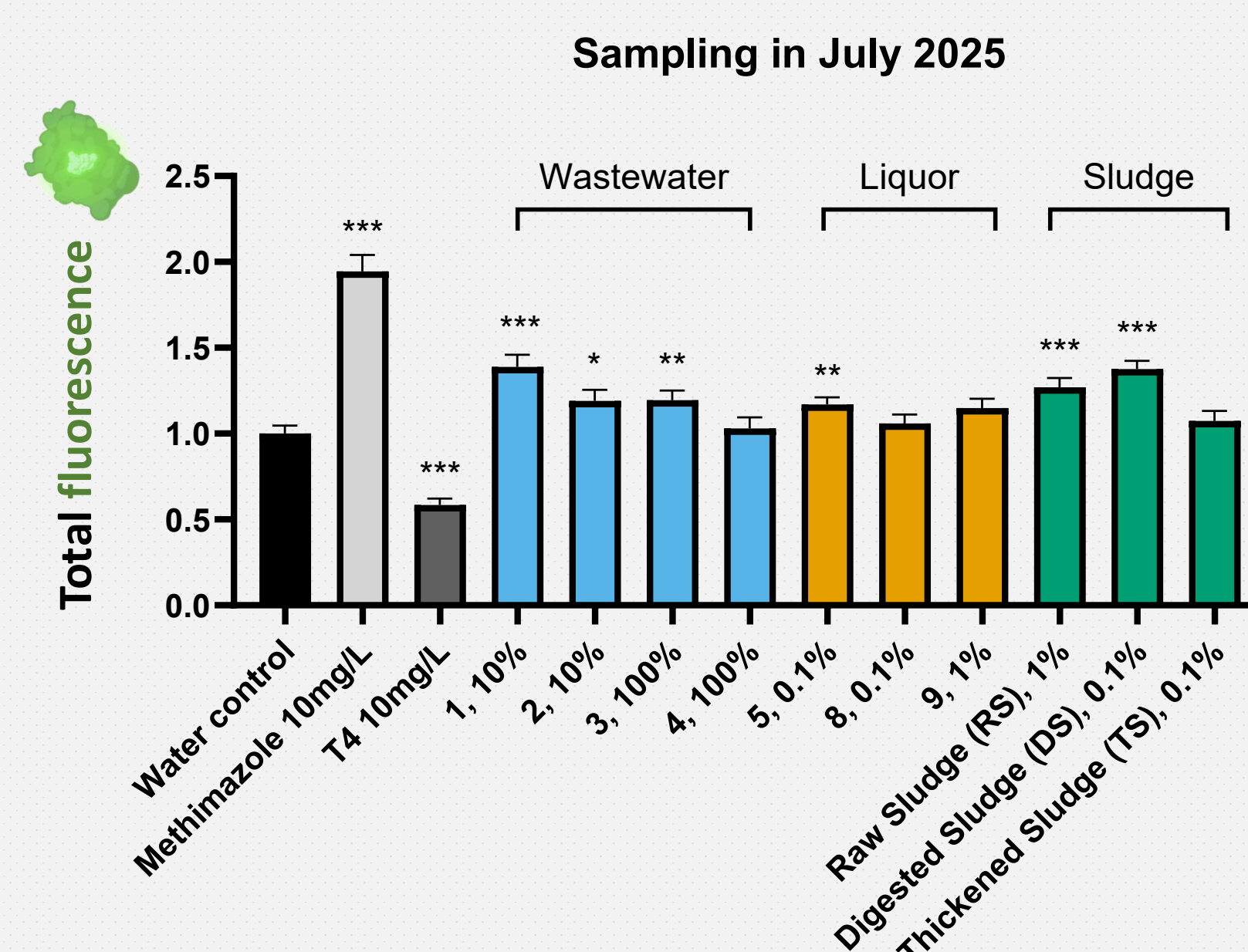
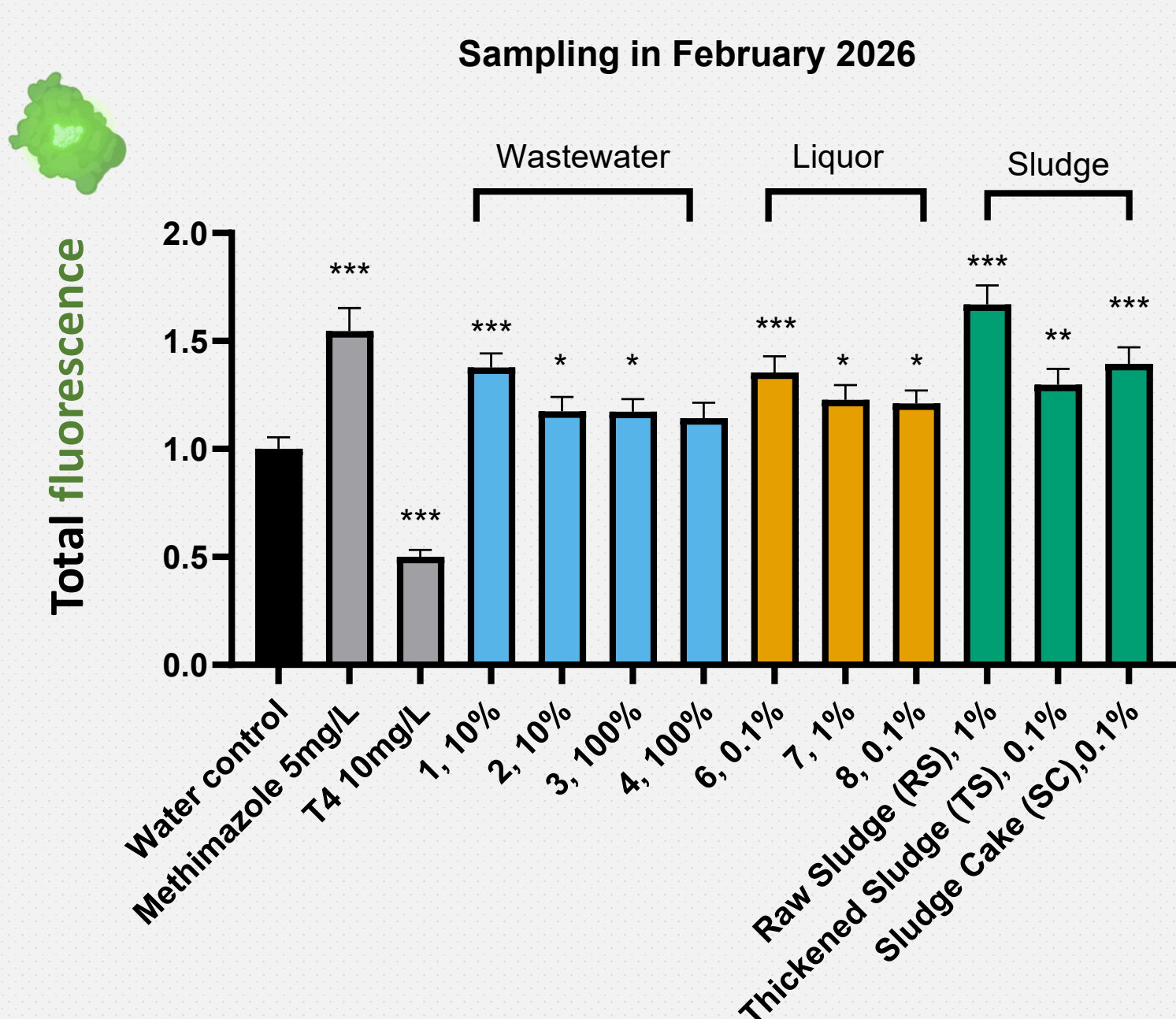
### Conclusion

- Results point to an **efficient removal of thyroid disruptors** during *wastewater* treatment;
- Sludge cake** (sampled in winter), which is being spread on agricultural soil, is **thyroid active**;
- Thyroid disruptors** can persist in the *sludge* and *liquor* samples during treatment.

### Methodology



### Preliminary bioassay results



- Thyroid activity is detected in the raw wastewater, but not in the effluent released into the Seine river;
- Thyroid activity is detected in some liquor samples, notably the water removed via settling tanks following anaerobic digestion (●5) and thermal treatment (●6);
- Raw sludge** is showing **thyroid activity** in both winter (February) and summer (July) samples;
- Sludge cake** (final product of the sludge treatment process) sampled in winter is **thyroid active**;

The results of **thyroid activity** of 1 week of samples per season, however, 3 weeks of sampling were performed per season though the results are not presented here. Asterisks mark the samples that are significantly different from the water control and thus active on the thyroid axis. Marked are also the dilutions of samples that are chosen based on the maximum tolerable concentration (highest concentration causing the mortality of less than two out of ten embryos) of each sample. Methimazole, induction control.; \*,  $P < 0.05$ ; \*\*,  $P < 0.01$  \*\*\*:  $P < 0.001$ .

LABORATOIRE  
WATCHFROG



This research is co-funded by the EU Framework Program for Research and Innovation Horizon Europe under grant agreement No.101120427 (HORIZON-MSCA INCLUE).

Contact me!

LinkedIn



sara.cvetkovics@watchfrog.fr