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Diving into the chemistry of sponge exo-metabolomes: contribution of brominated specialized metabolites

Morgane MAUDUIT¹, Stéphane GREFF¹, Thierry PEREZ¹, Charlotte SIMMLER¹

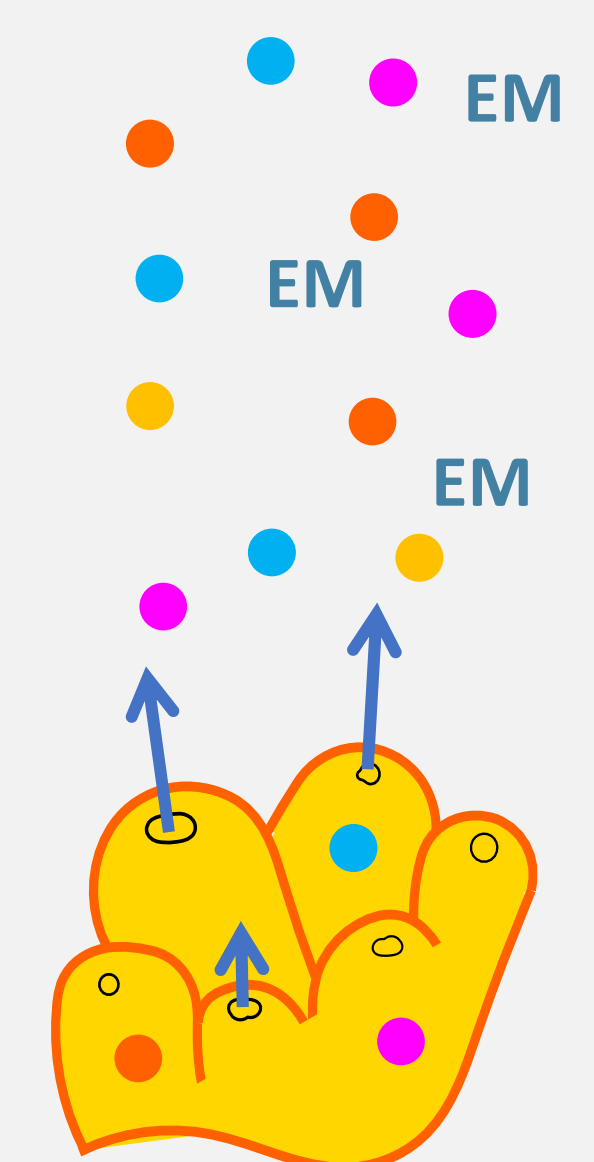
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Context

- Sponges produce **structurally diverse specialized metabolites** known for their biological/pharmacological potentials.^{1,2} In particular, the Mediterranean sponges *Aplysina cavernicola* and *Agelas oroides* produce **brominated** alkaloids with antimicrobial/anti-biofilm properties.^{3,4}
- A few targeted studies, performed on Caribbean species from the same genus, reported that the most abundant brominated alkaloid (e.g. aerothionin, oroidin) were detected in the seawater surrounding the sponges (●●●●●).^{5,6}
- Hence, such exo-metabolites (**EM**) could be collected from the seawater without destroying the sponge biomass.

EXO-METABOLOME

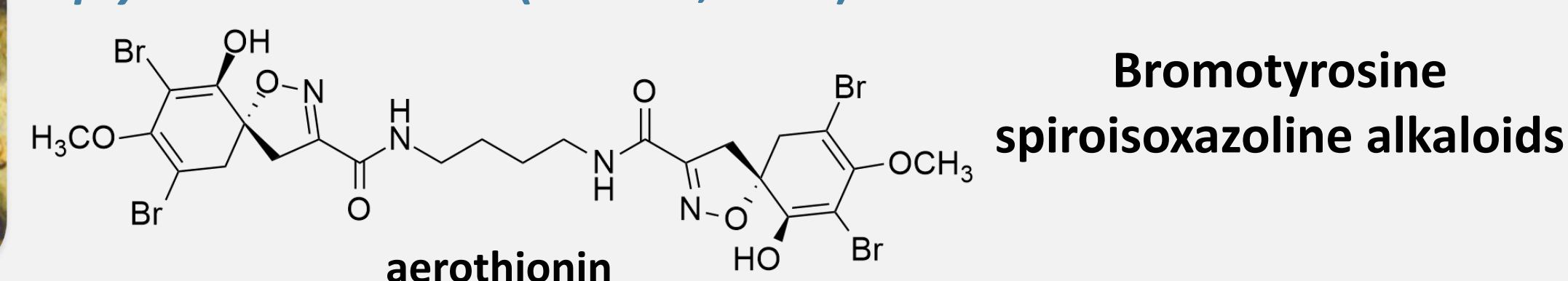


METABOLOME

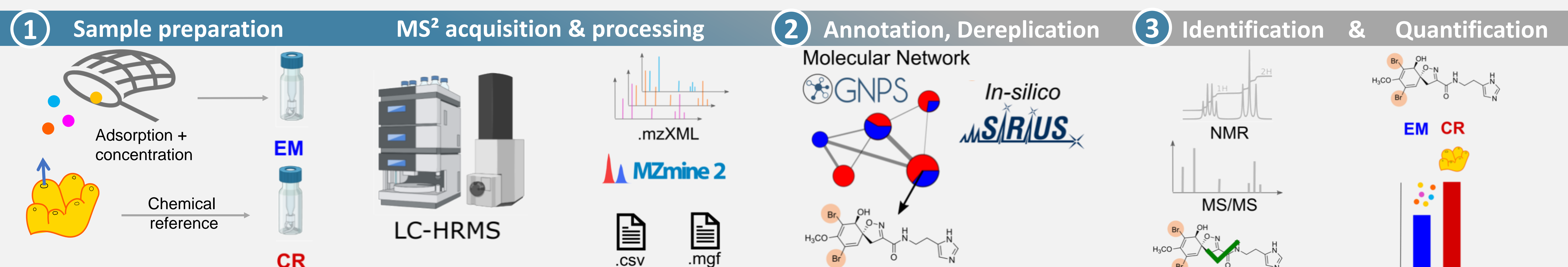
What is the proportion (diversity & quant.) of specialized metabolites released by *A. cavernicola* & *A. oroides* in their surroundings?



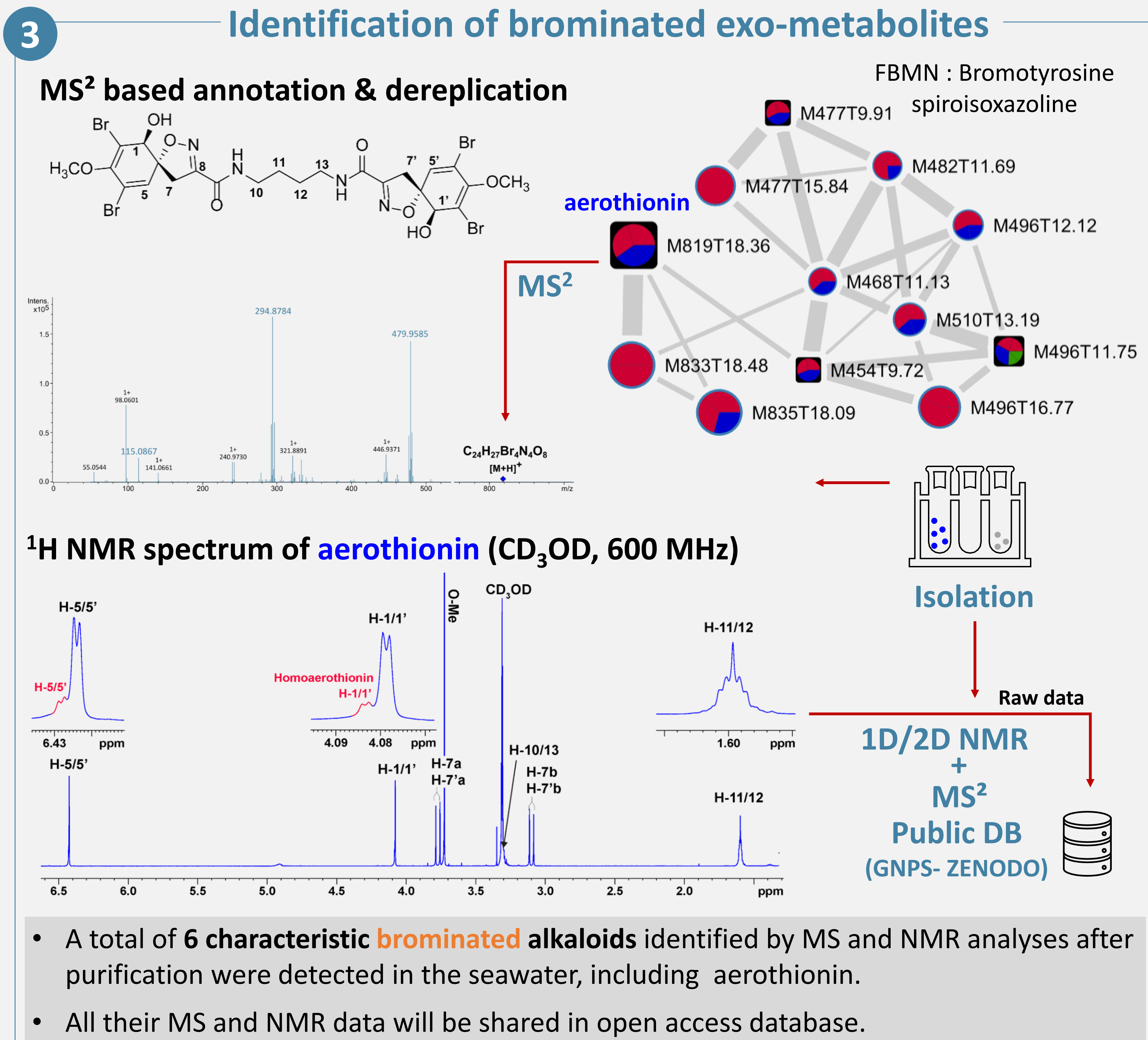
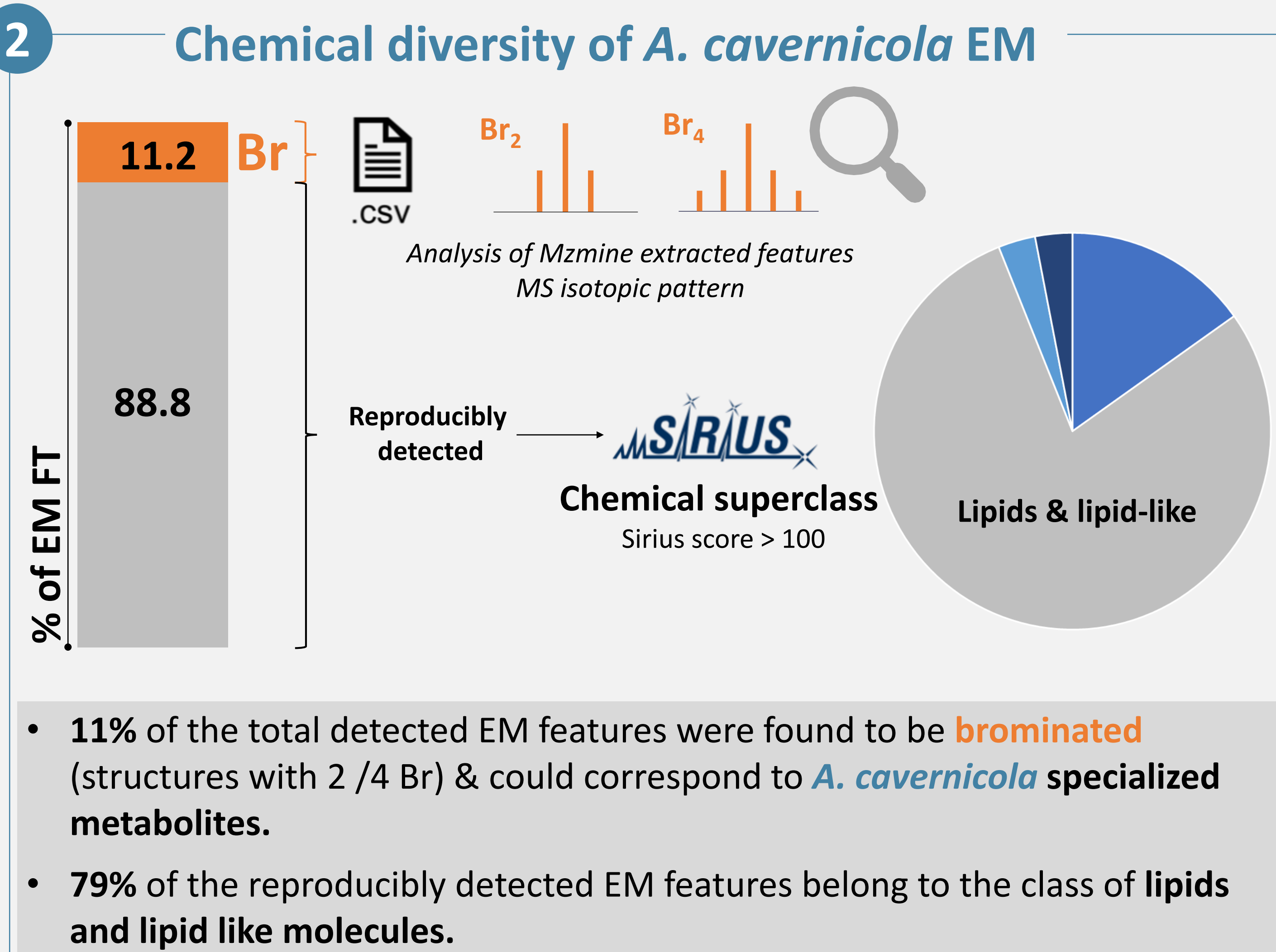
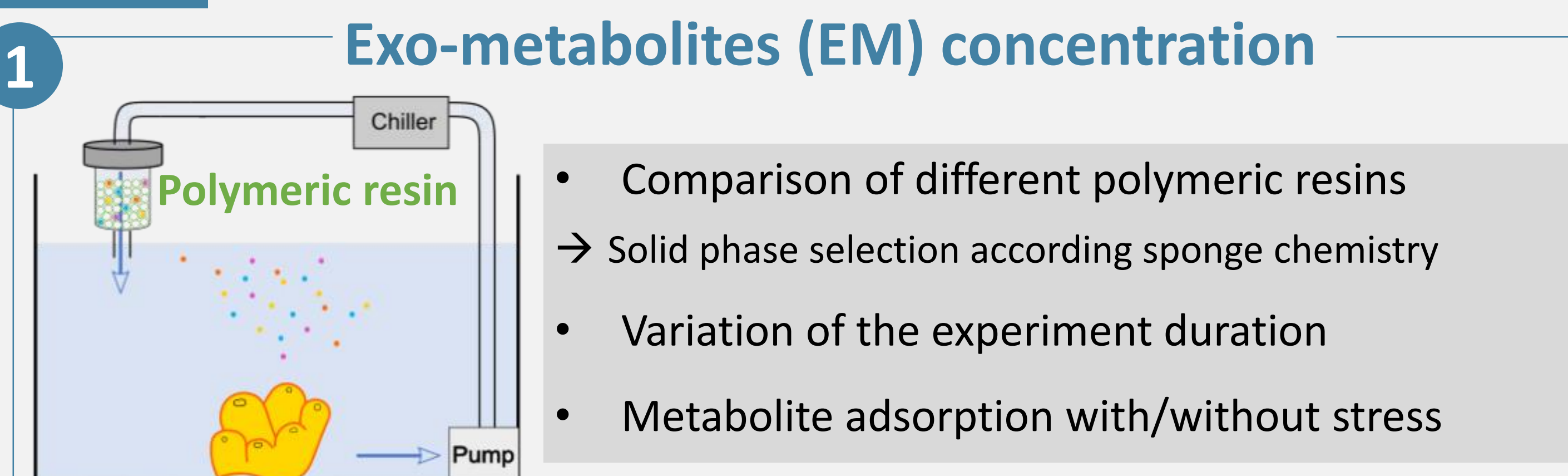
Aplysina cavernicola (Vacelet, 1959)



Agelas oroides (Schmidt, 1864)



Results



Conclusions & Perspectives

- The present experimental and analytical workflow enable us to determine the proportion & identity of brominated exo-metabolites (EM) recovered from the seawater surrounding *A. cavernicola*. The same workflow was implemented with *A. oroides*. Quantitative analysis are in progress. Collectively, those EM are possibly released through the sponge metabolic activities & cellular turnover.⁷
- Such results will serve as a stepping stone to:
 - guide **in situ field work** to study the release of specialized metabolites by both sponge species
 - propose a **valorisation of sponge chemical diversity without collecting their biomass**

References:

1. Carroll, A. R., et al. *Nat. Prod. Rep.* (2022) 2. Pawlik, J., et al. *Mar. Ecol. Prog. Ser.* 127, 183–194 (1995) 3. Peng, J., et al. *AlkaloidsChemBiol.* 61: 59–262 (2005) 4. Richards, J., et al. *Bioorg Med Chem Lett.* 18(15):4325–7 (2008) 5. Walker, R. P. et al. *Mar Biol* 88, 27–32 (1985), 6. Richelle-Maurer, E, et al. *Biochemical Systematics and Ecology* 31, 1073–1091, (2003) 7. de Goeij, J. M., et al. *Science* 342, 108–110 (2013)