

Unravelling the roles of surfactin in plant immune activation

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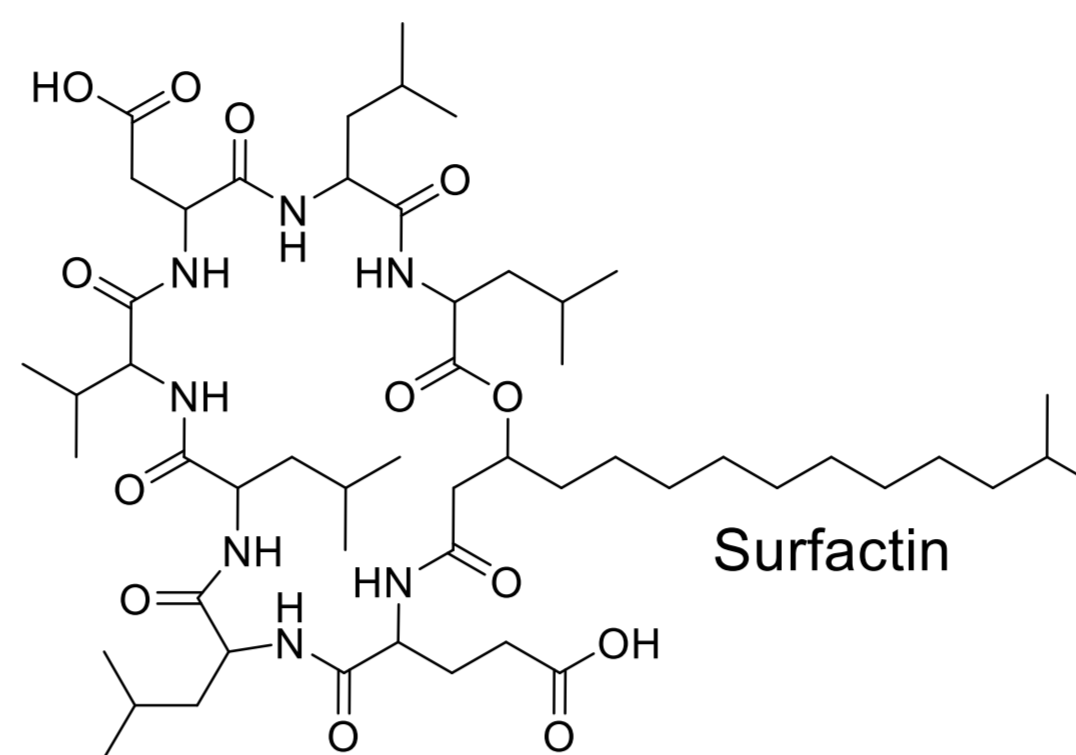
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Context

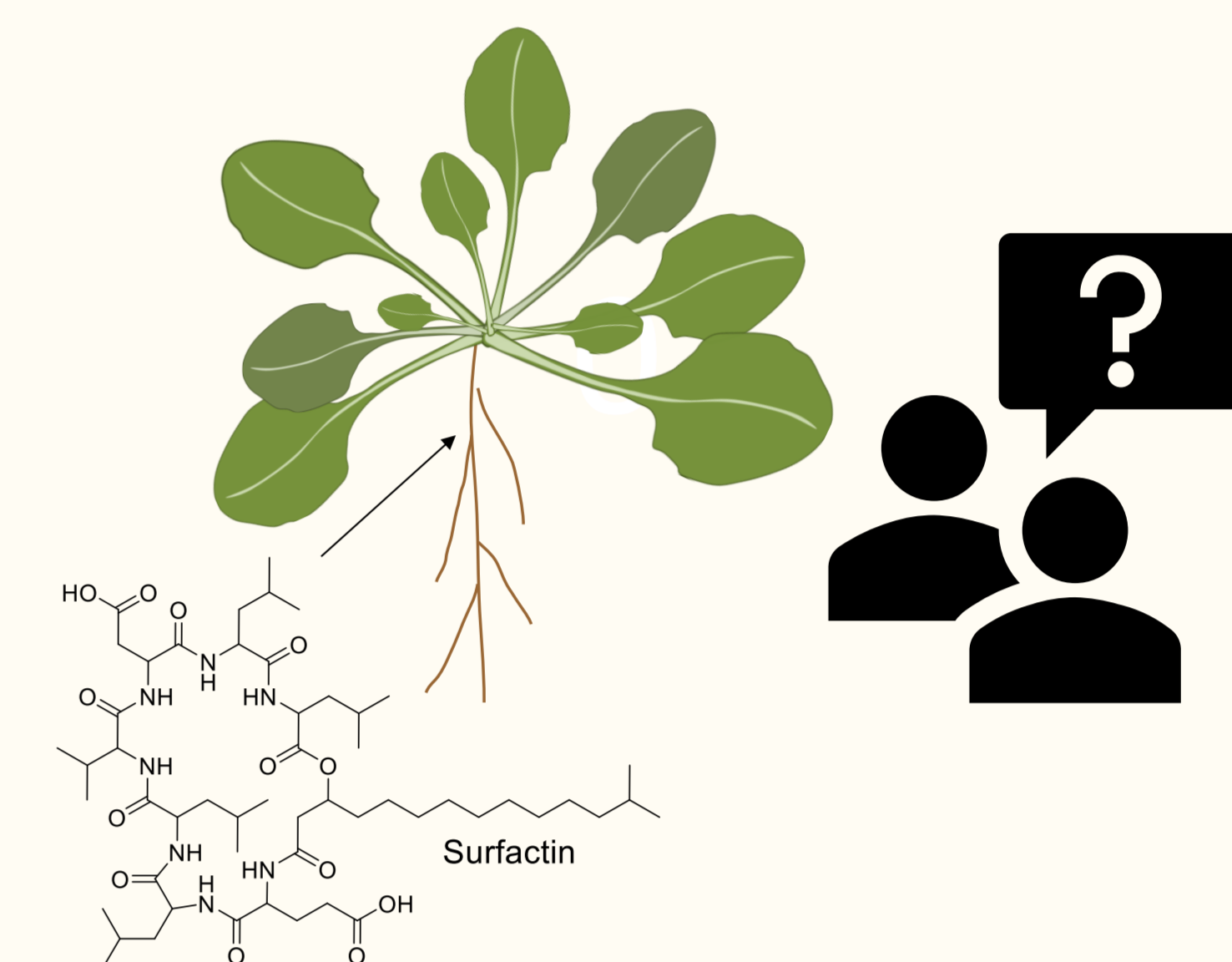
The study of plant-microorganism interactions underscores the crucial role of the plant-associated microbiome, especially within the rhizosphere. This highly diverse microbial community includes both pathogens and beneficial microorganisms, such as PGPRs (*Plant Growth-Promoting Rhizobacteria*). Among PGPRs, *Bacillus spp.* are notable for producing various secondary metabolites, including lipopeptides with antimicrobial and immunostimulant properties. One of those lipopeptides, surfactin, can trigger induced systemic resistance (ISR) in plants, enhancing their immune responses and enabling a faster, stronger reaction to pathogen attack.^{a-d} This priming effect makes surfactin a promising candidate for biological control strategies.

Plant responses against pathogenic infections are numerous and notably include production of phytohormones, phytoalexins, reactive oxygen species (ROS) and cytosolic calcium influxes.^{b-c} However, although surfactin is known to induce ISR in plants, the molecular changes induced by its presence in root environment are still unknown.



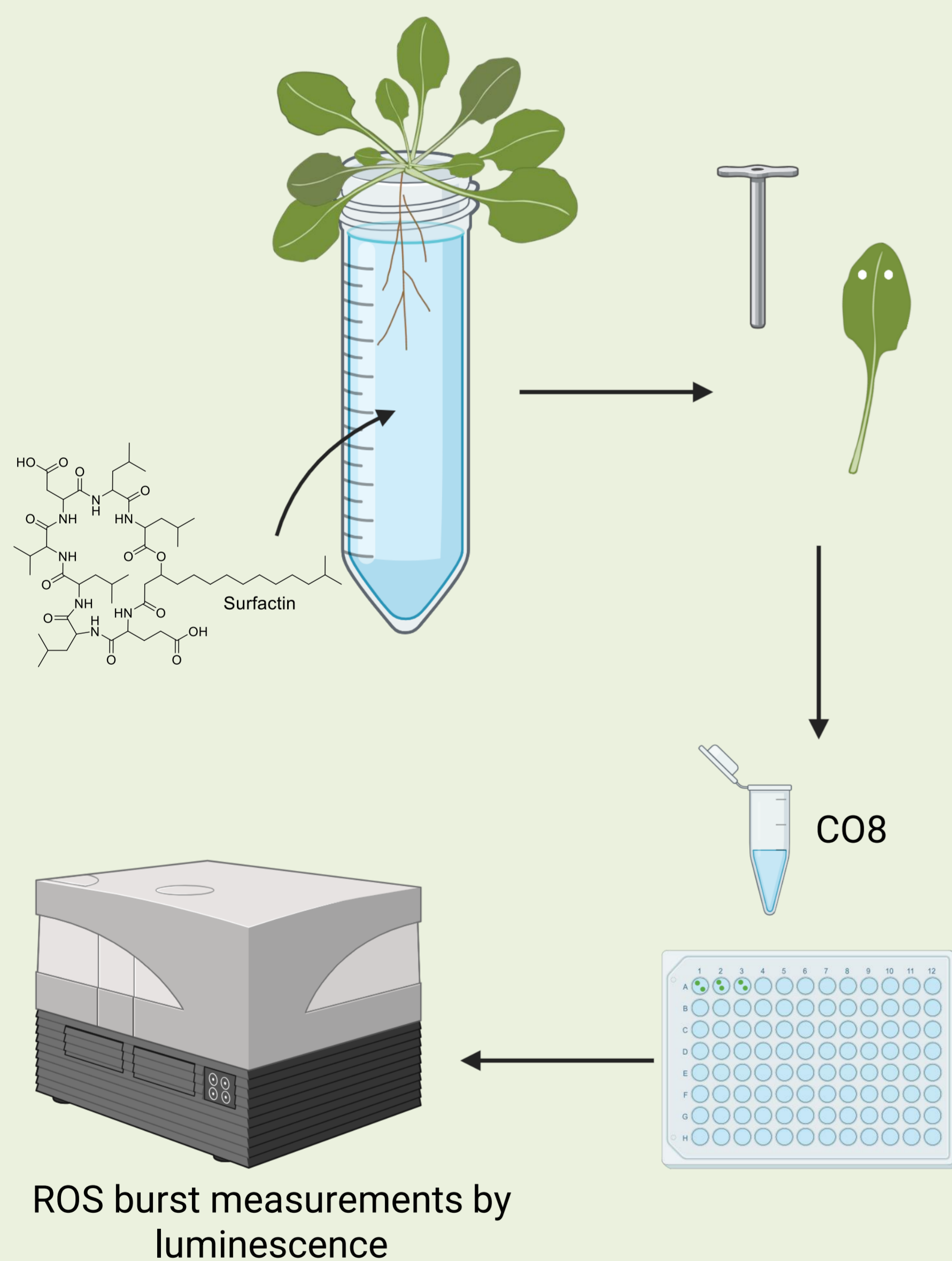
Objectives

This study aims to understand the metabolomic modifications induced by the presence of surfactin. In particular, molecules that are locally accumulated in roots and those that are translocated and/or accumulated in the infected tissues will be identified and characterized.



The induction of the systemic immune activation (SIA) by surfactin will be demonstrated by ROS measurement before studying the metabolome of the plants.

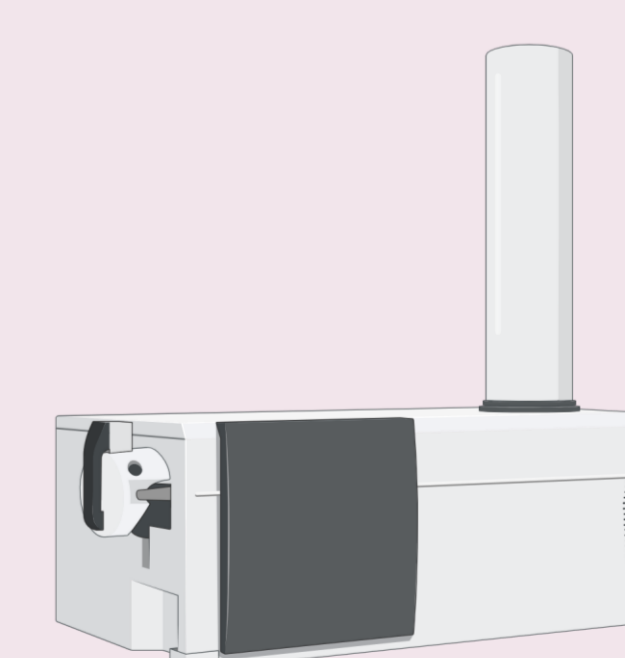
Methods



Results

Conclusion and perspectives

We intend to develop two LC-MS/MS approaches that will be combined: a targeted analysis of phytohormones and a non-targeted analysis. By characterizing changes in the metabolome of leaves and roots of *A. thaliana* following surfactin priming, we aim at identifying the compounds involved in signaling and in the defense responses, in a time-course context.



References

- a) Prsic J., & al. Front. Plant Sci. (2020)
- b) Jeworutzki E., & al. The Plant Journal (2010)
- c) Mousavi S., & al. Nature (2013)
- d) Gilliard G., & al. Unpublished (2023)

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Poster created with BioRender

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