

Impact of VOC exposition and solar radiation on skin

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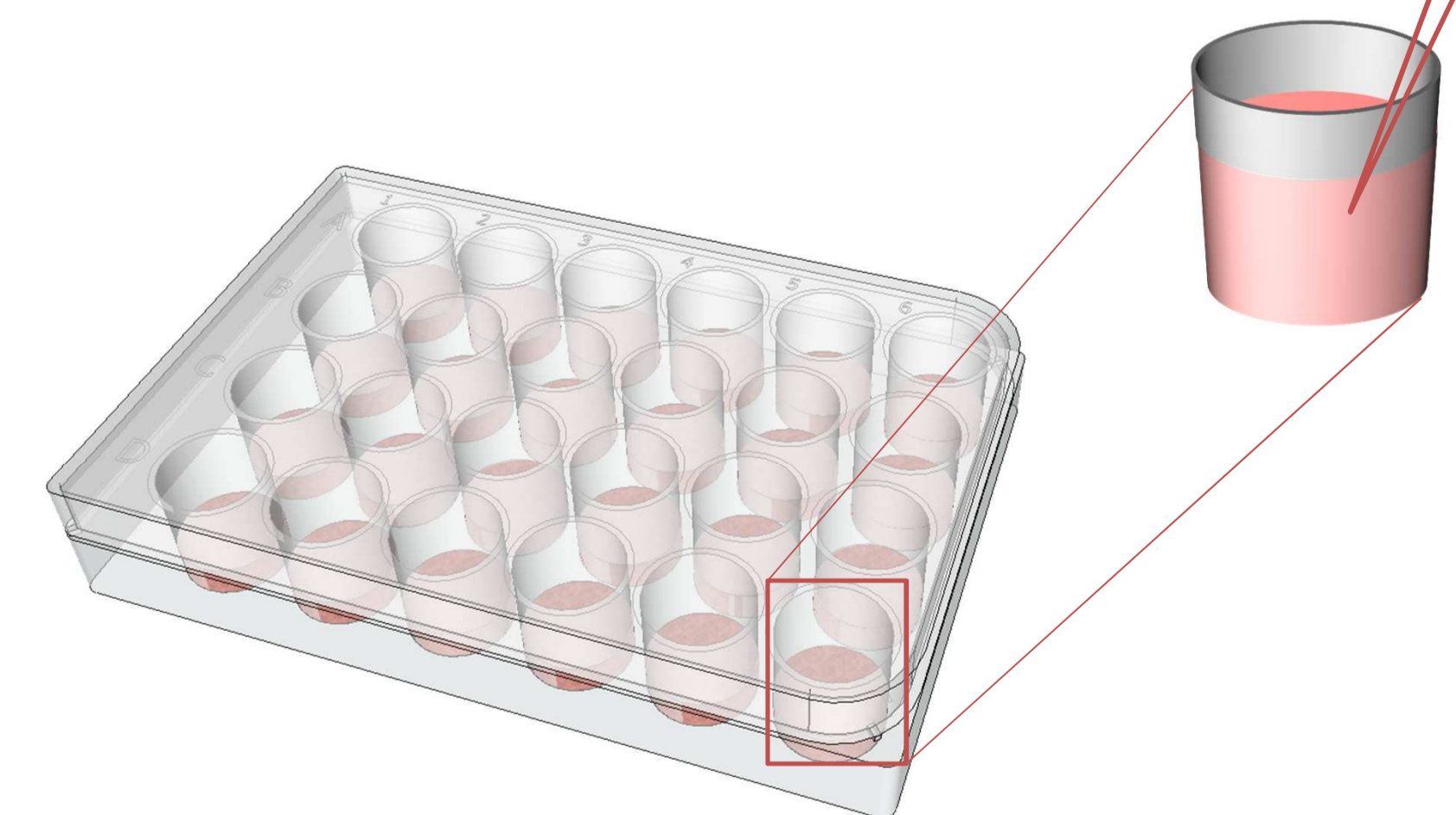
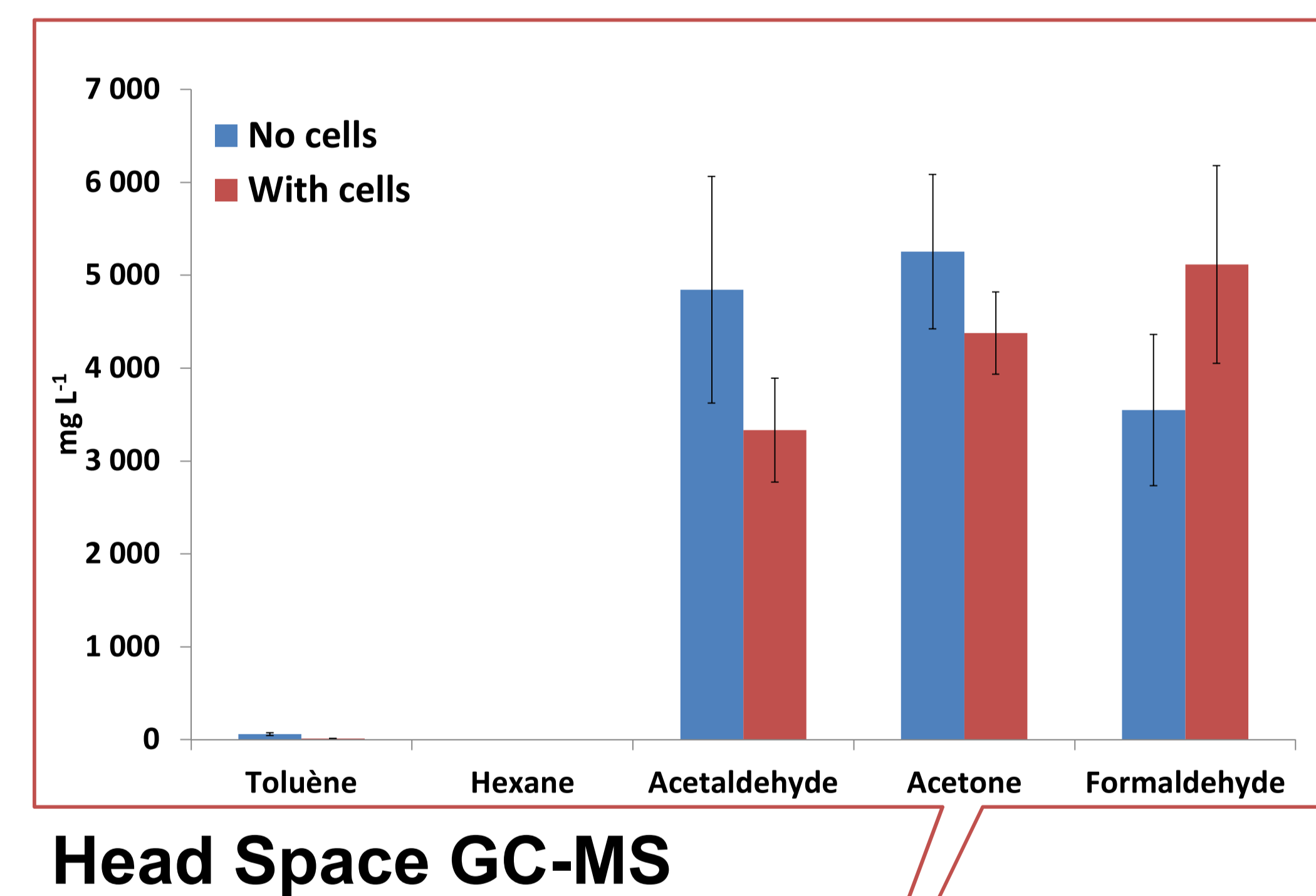
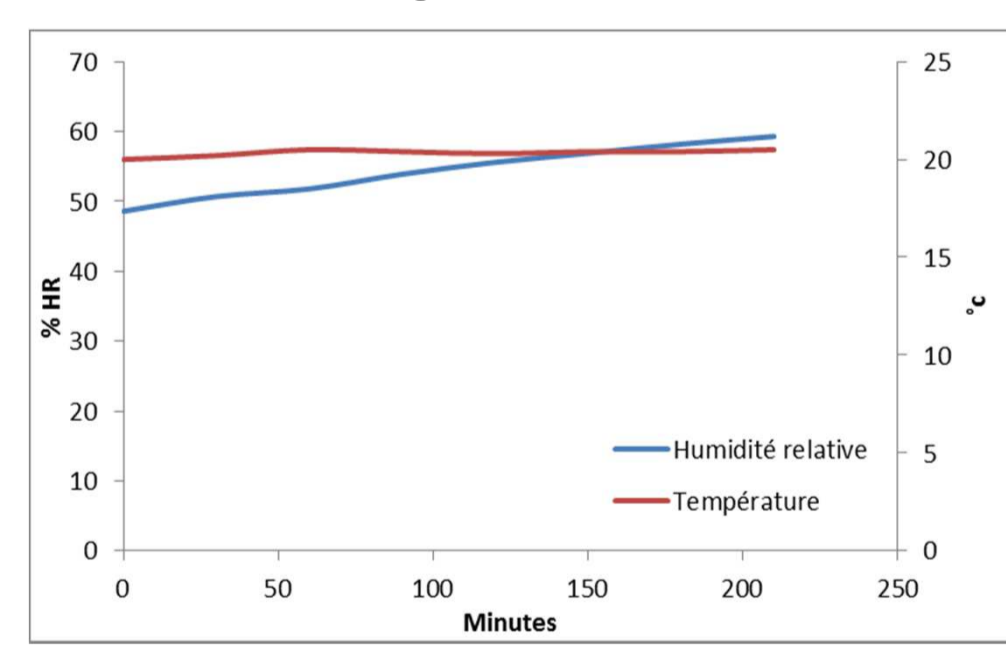
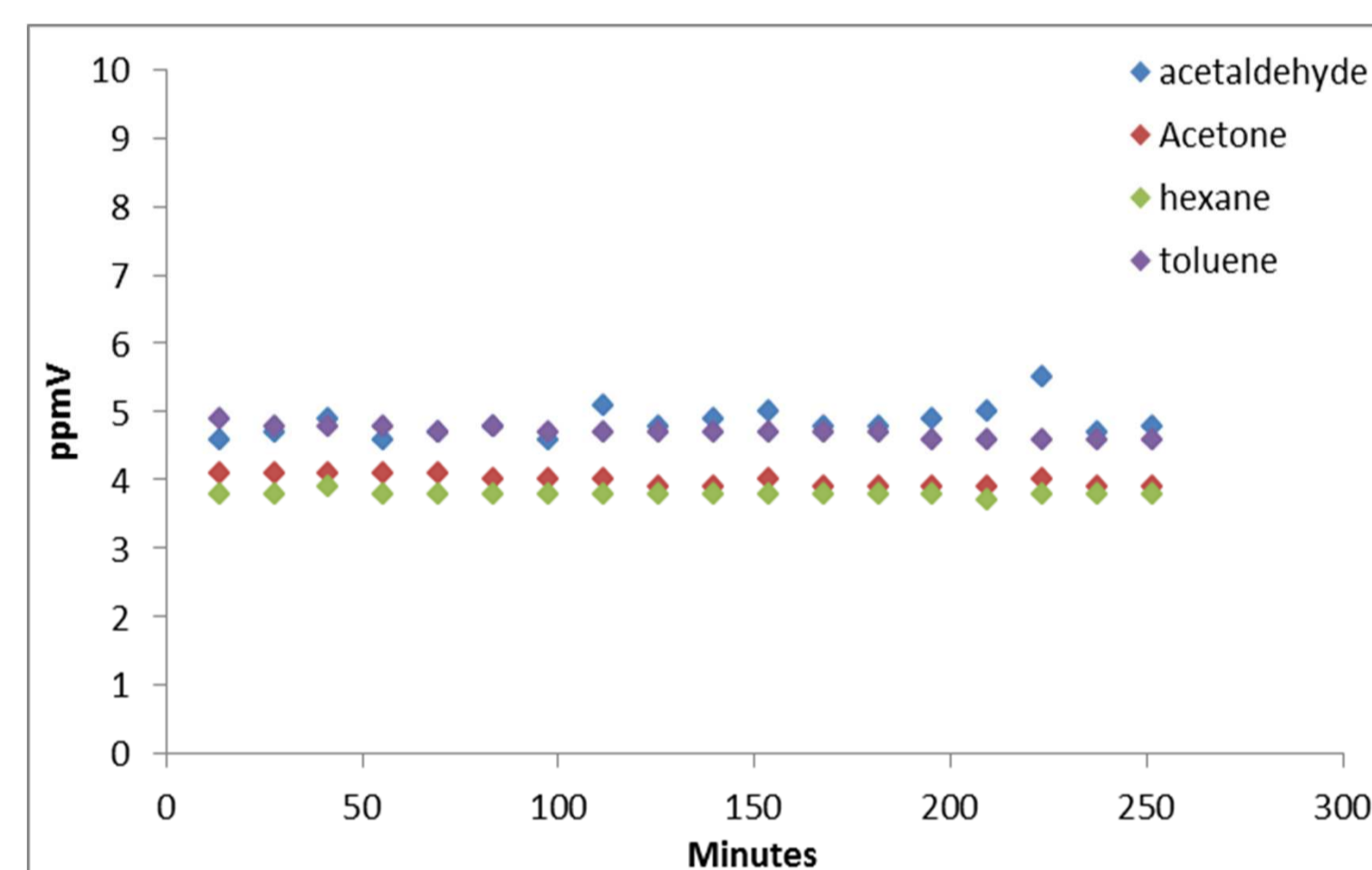
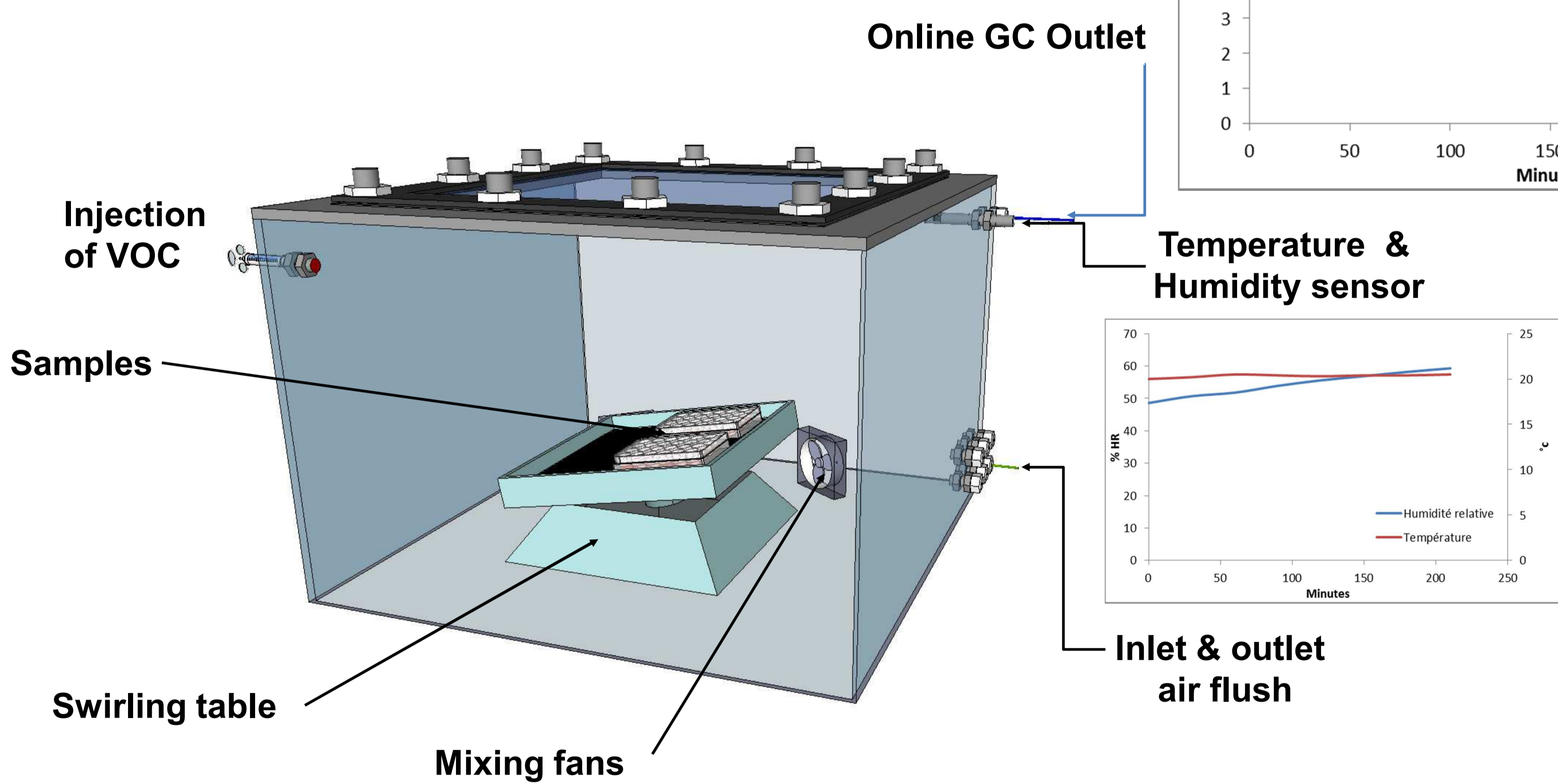
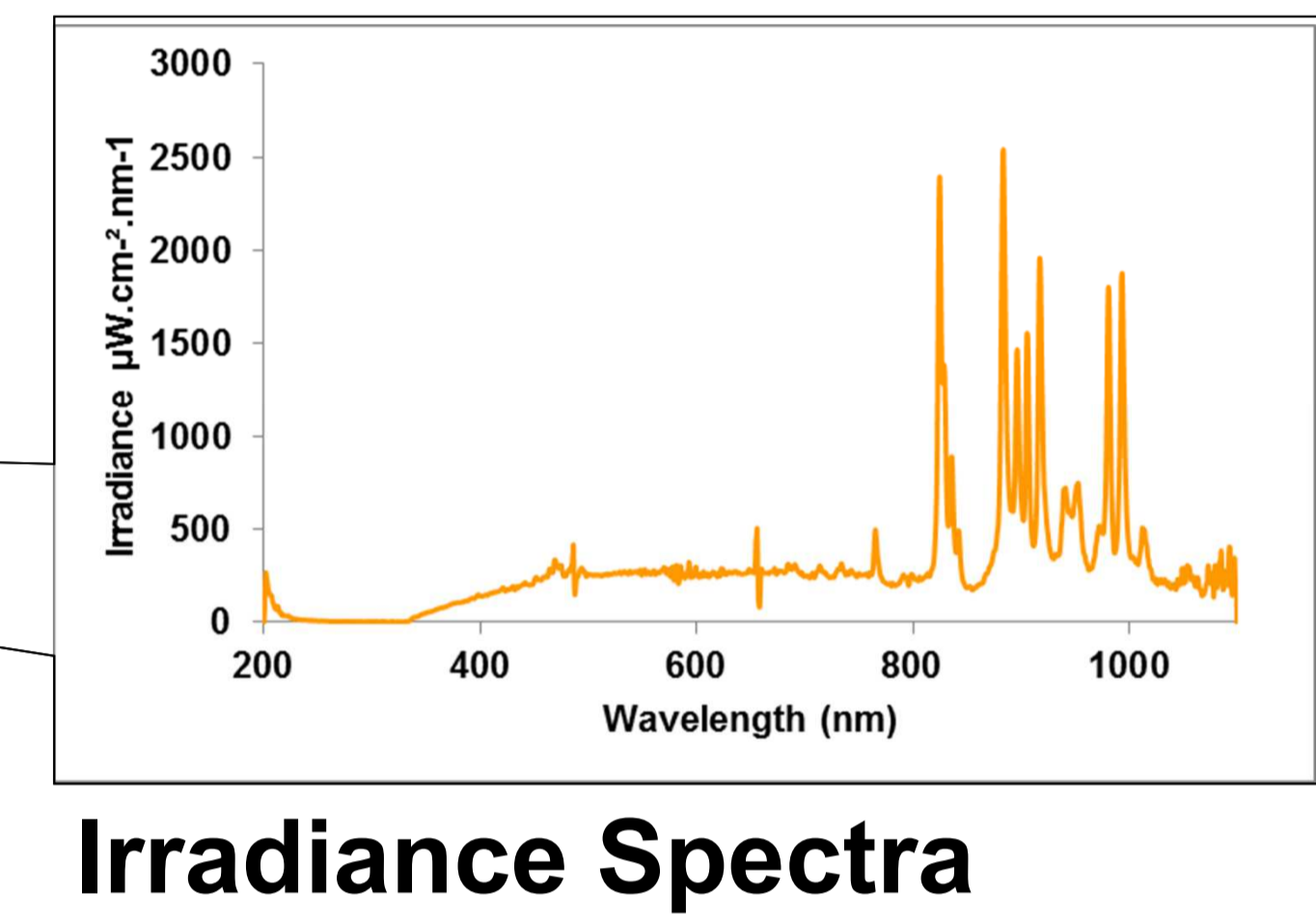
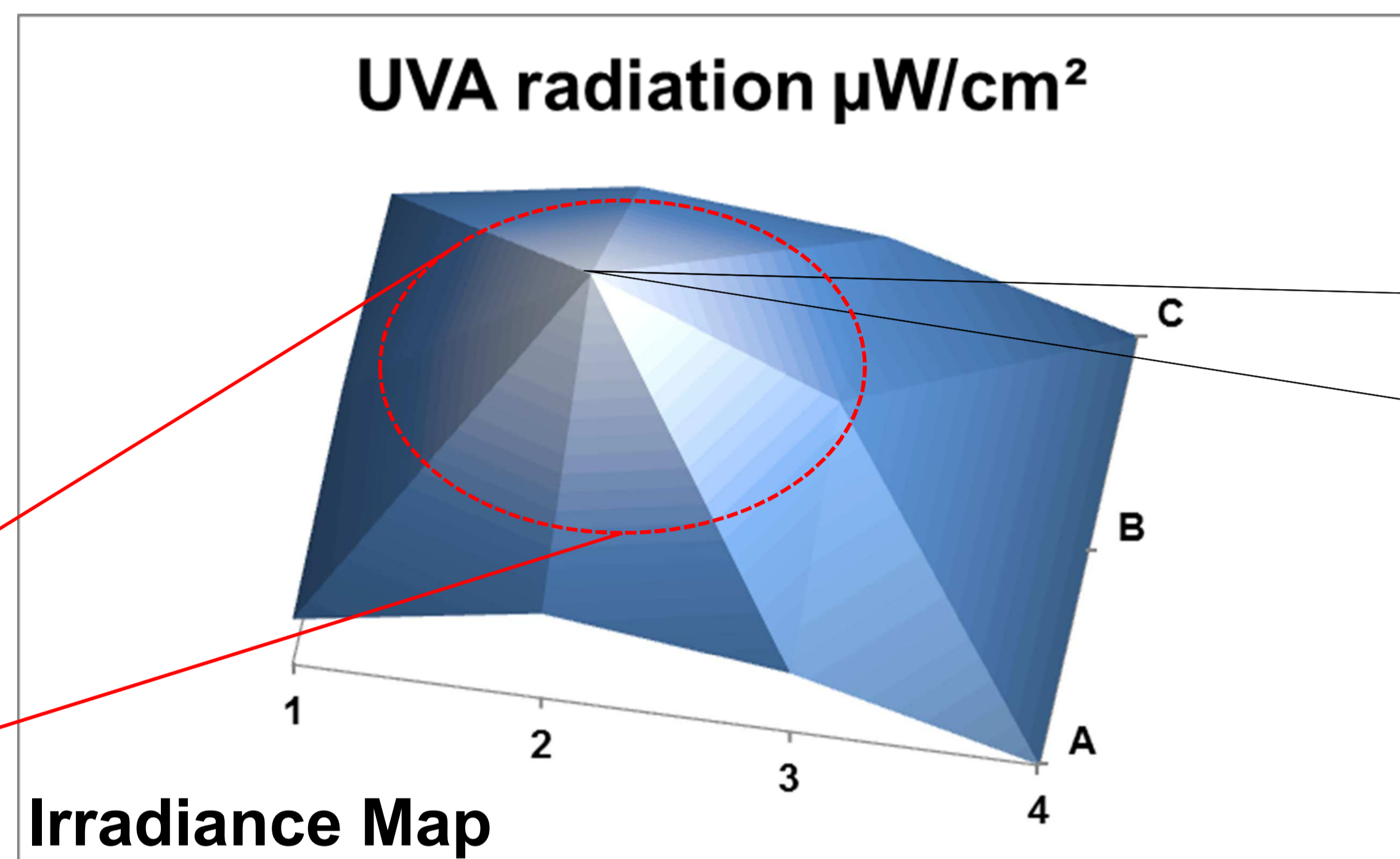
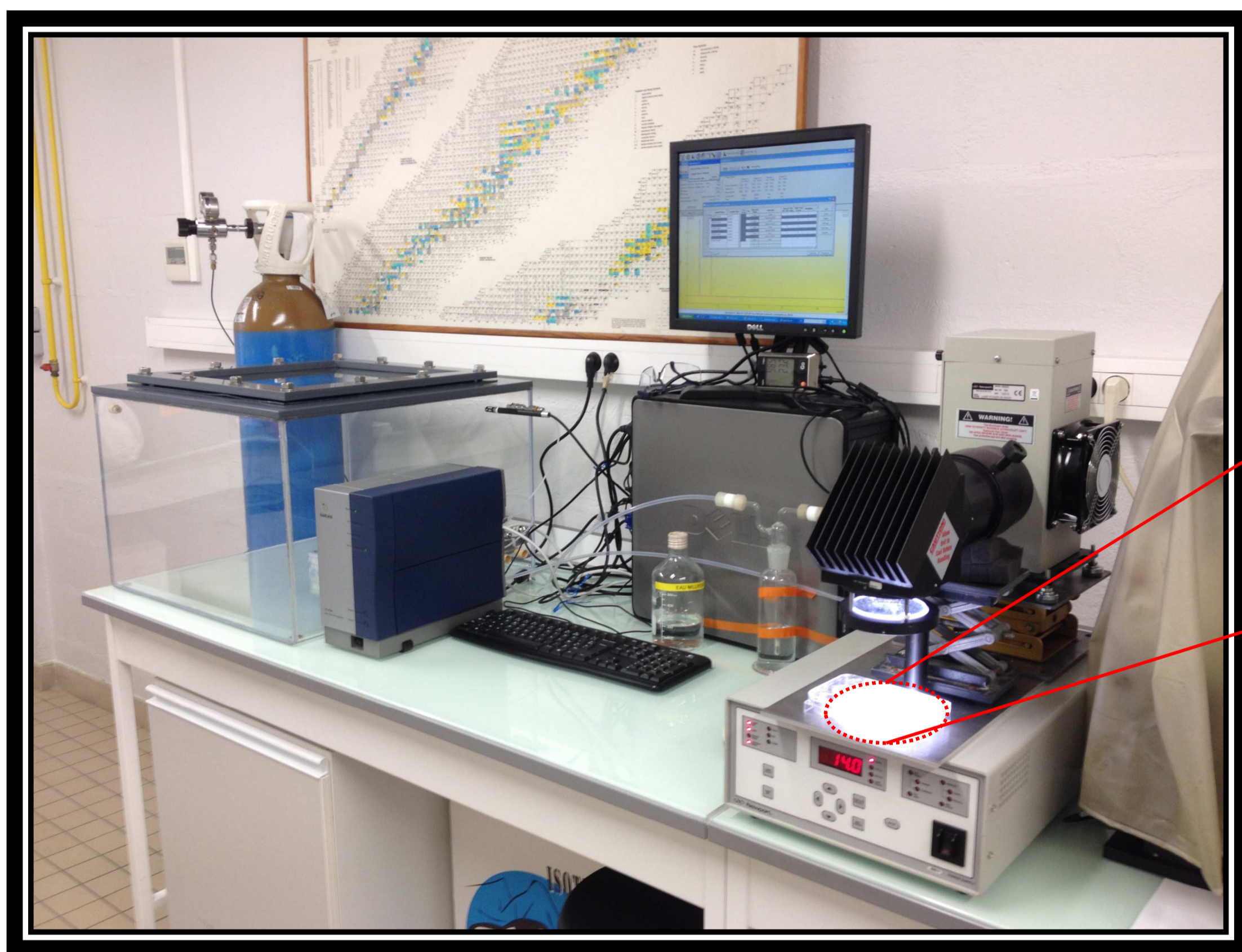
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Summary/Objective :

- **Skin = important exchange surface** between our organism and environment. Gradual response to chemical and physical stress (from erythema to carcinogenesis passing by inflammation, eczema and aging).
- **Objective:** effect of **solar UVA and UVB radiation on skin** + previous **exposition to a cocktail of Volatile Organic Compounds (VOC)** representative of indoor air pollution (Acetaldehyde, Formaldehyde, Acetone, Hexane and Toluene).
- **Method:** specific setup to expose biological samples to stable concentrations of indoor air VOC.
 1. Gas composition carefully adapted to the model to obtain a reversible effect while maintaining the cell survival.

2. Chemical stress followed by solar radiation exposition (ratio UVA/UVB well controlled)
3. The radiation exposure adapted to our biological models
→ significant but reversible effect on cells.

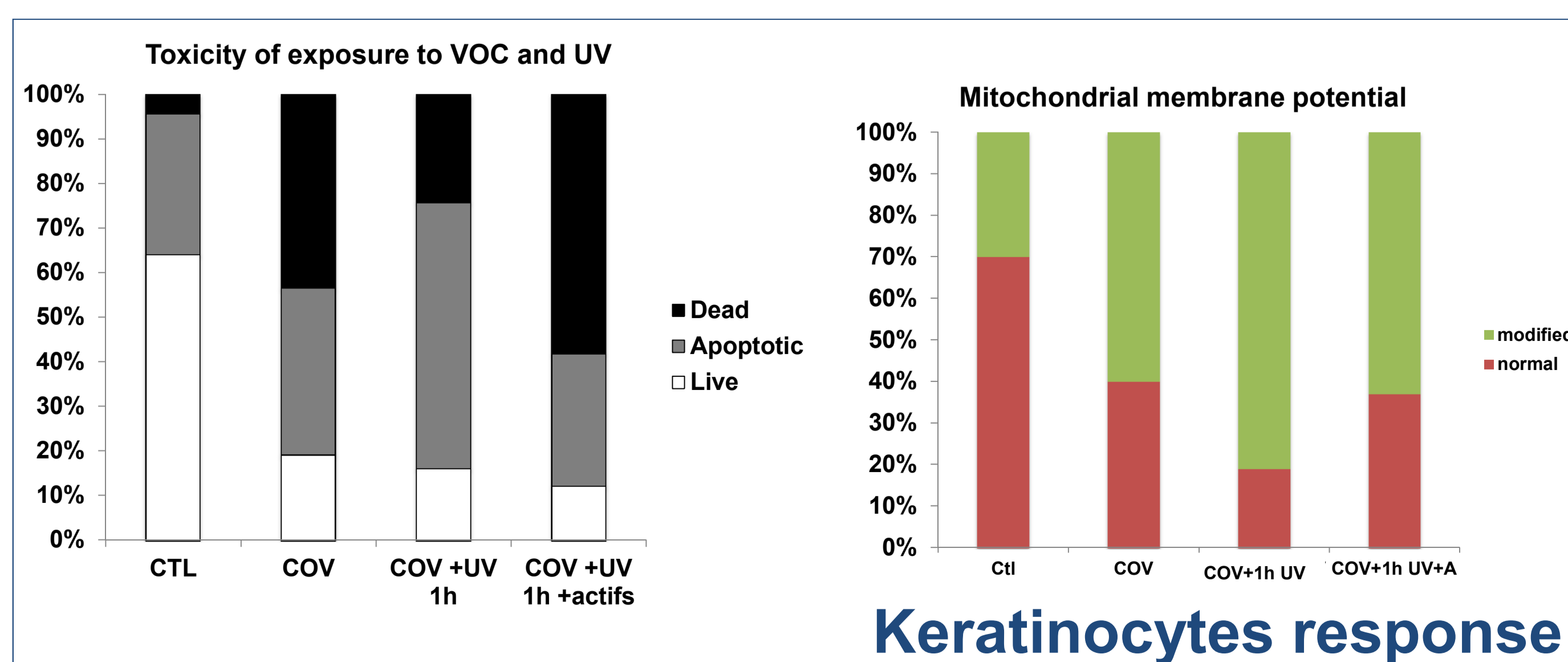
- **Results: potentiation of both exposures on keratinocytes and skin explants**, even if the toxic VOC concentrations adapted to the model were higher than in real conditions but lower than INRS recommendations for persistent exposure with patch test.



VOC exposure Setup

INERIS-DRC-10-109974-00925A

« Le formaldéhyde est faiblement irritant pour la peau à des concentrations inférieures à 1% et corrosif à concentration élevée ».



Conclusion:

- Controlled VOC and UV exposures allowed the study of their toxic effects and of the activation of signaling pathways in cultured keratinocytes and skin biopsies.
- Significant effect on keratinocytes with only 20 ppmV of a VOC mixture and 100 ppmV on skin biopsies.
- Main effect attributed to formaldehyde, able to induce keratinocytes apoptosis at 4 ppmV during 4 hours.
- This setup can be easily upgraded with air containing 5 % CO₂ : improvement of cultured cell survival and increase of the exposure time with decrease of VOC concentration closer to real conditions.