
The cloud microbiota

Microorganisms-H₂O₂ interactions

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Our team works on microorganisms present in clouds collected at the puy de Dôme observatory which is a GAW (Global Atmosphere Watch) station¹. We have shown that these microorganisms are metabolically active in clouds and we try to demonstrate that they can modify the chemical composition of clouds and be an alternative route to radical chemistry.

In this talk we present in more details our work related to the interactions of microorganisms with H₂O₂ which is the main sources of radicals in cloud waters.

Using microcosms mimicking the cloud environment we have determined biodegradation rates of H₂O₂ and compared them with photo-transformation rates^{2,3}. In parallel a transcriptomics approach was used to look at the *in-cloud* activity of the cloud microbiota⁴. Finally the impact of H₂O₂ on cloud metabolism was assessed using a metabolomics approach⁵

We have shown that microorganisms can biotransform H₂O₂ thanks to their catalases, both *in lab* and *in-cloud* experiments. In parallel, this strong oxidant modulates the microbial energetic metabolism and many metabolic pathways. Considering that H₂O₂ concentration is highly variable (day vs night, seasons, pollution..), these interactions are very complex.

As H₂O₂ is a key component of atmospheric chemistry, work is in progress to integrate this microbial activity towards this oxidant in a

multiphase atmospheric chemistry model within the frame work of two French ANR projects (METACLOUD and MOBIDIC).

References

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