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Study of nitrogen compounds in different atmospheric compartments

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Why study of nitrogen compounds ?

- > Studies known about atmospheric nitrogen:
 - Inorganic nitrogen
 - Amino acids
 - Metaproteomic (few studies)
- > Gap between nitrogen compounds researches: what about small peptides? secreted proteins?
- > Proteins / small peptides could be:
 - enzymes (compounds degradation)
 - allergens (health diseases)
 - communication molecules (cellular activity - communication)
 - ... and contribute to nitrogen cycle

Sampling

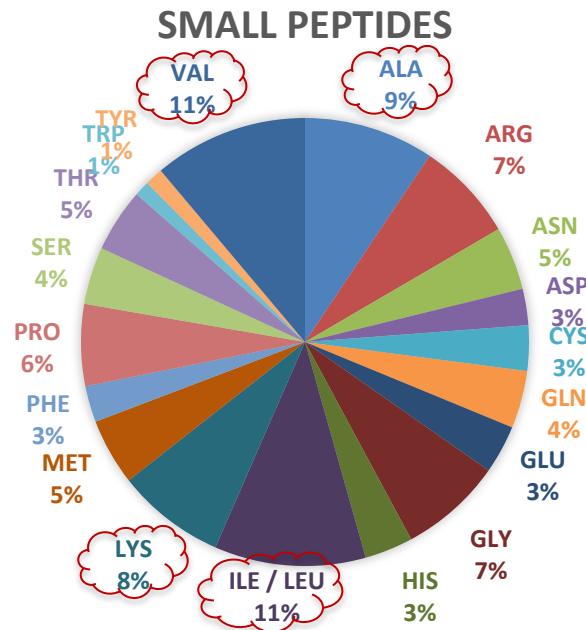
- > Aerosols, clouds, precipitations (rain - snow)
- > Sampling is made in liquid media containing protease inhibitor
- > Sampling sites:
 - Aerosols - Opme (Clermont - Ferrand, France)
 - Clouds - Puy du Dôme (Clermont - Ferrand, France)
 - Rain - Opme (Clermont - Ferrand, France)
 - Snow - Puy du Dôme (Clermont - Ferrand, France)



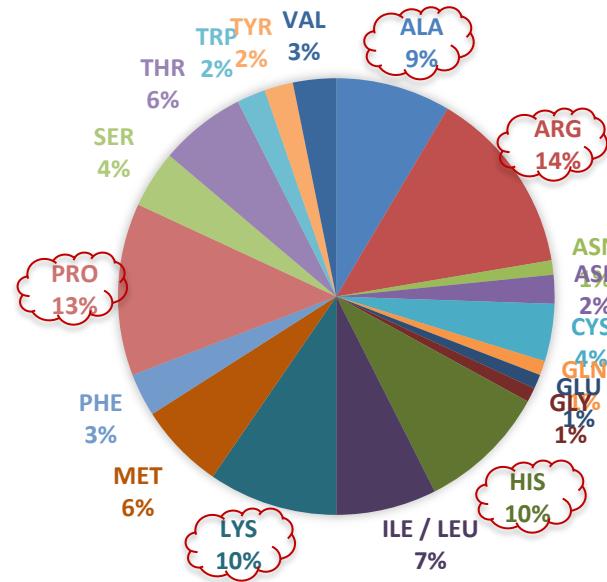
Rain collector - Opme

Small peptides characterization example in rain

MAX AMINO ACIDS PROPORTION IN RAIN



MIN AMINO ACIDS PROPORTION IN
RAIN SMALL PEPTIDES

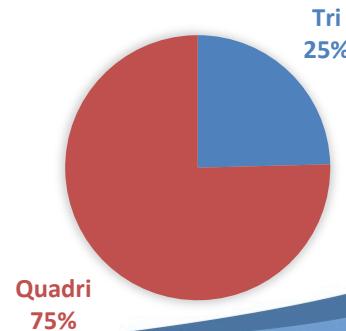


Proportion of Amino Acids in small peptides:

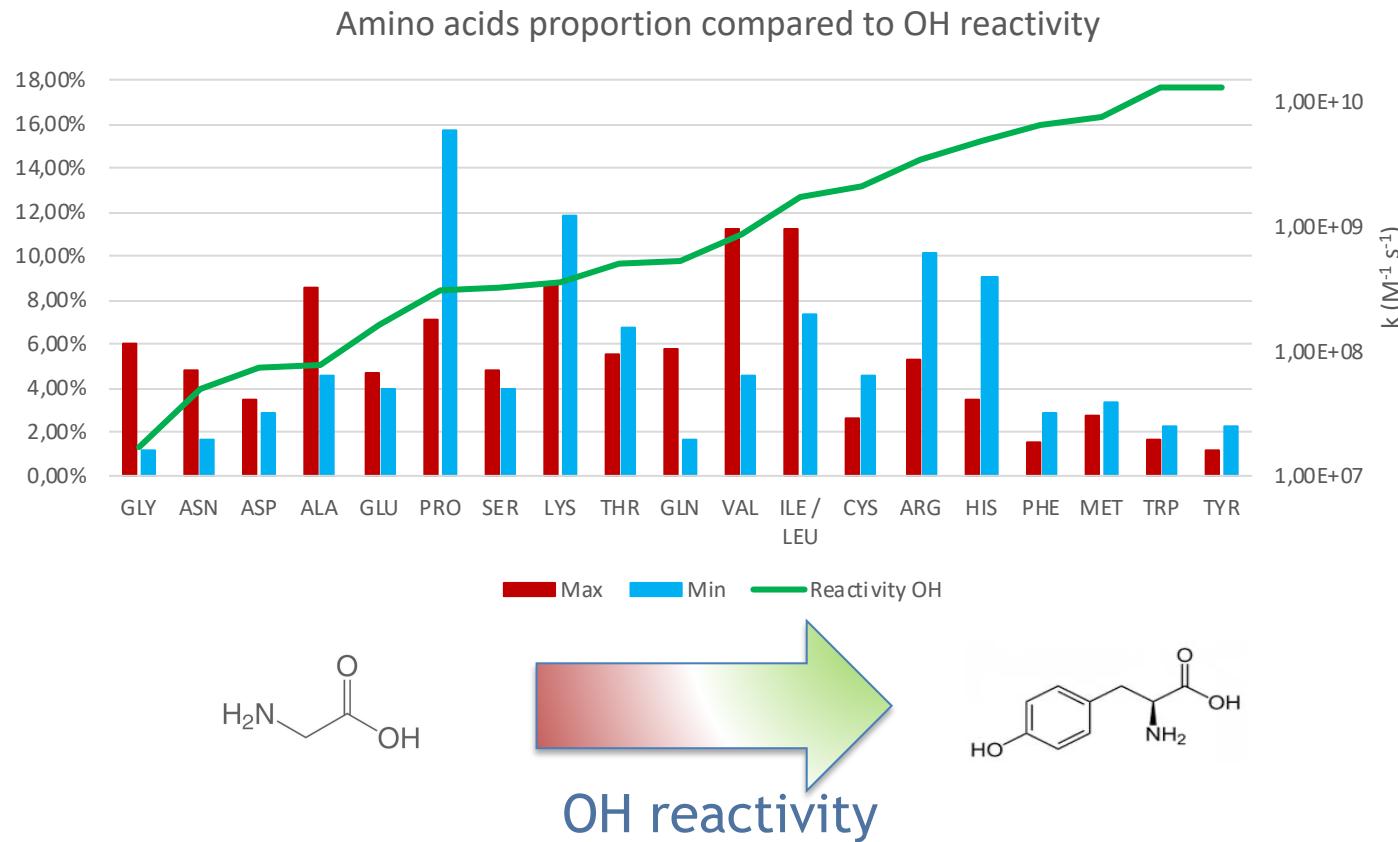
- Max - Valine, Leucine / Isoleucine, Alanine and Lysine
- Min - Arginine, Proline, Histidine and Lysine

Majority of free quadripeptides in this sample

PROPORTION OF SMALL
PEPTIDES IN A RAIN SAMPLE



Photochemical fate of small peptides



Comparison between Amino Acids proportion in small peptides and their OH reactivity constant after rain water irradiation under solar light like

Perspectives / Outlook

- > Proteome investigation of atmospheric microorganisms : **activity** of a specific strain in **atmospheric conditions** (cold shock...)
- > Metaproteomics will permit to determine **community activity in atmosphere**
- > Photochemistry : photo-degradation of proteins and small peptides to determine their **contribution to nitrogen cycle**