

Recent developments in gas phase ion spectroscopy for structural analysis of sugars

Baptiste MOGE [1], Alicia INFANTINO [1], Ozgur YENI [1], Isabelle COMPAGNON [1]

[1] Univ Lyon, Université Claude Bernard Lyon 1, CNRS, Institut Lumière Matière,

baptiste.moge@univ-lyon1.fr

Oligosaccharides play vital roles in living organisms. Despite this vital importance, structural analysis of oligosaccharides suffers from a lack of a universal method to fully characterize them. Indeed, glycans have complex structures, especially due to the presence of numerous isomers, which complicates analyses. Ion vibrational spectroscopy coupled to mass spectrometry includes an ensemble of methods initially developed to answer chemical-physics questions. These techniques are increasingly used for the purpose of structural characterization of sugars, including the resolution of isomers and anomers^{1,2}.

Our spectroscopic scheme of choice is InfraRed Multiple Photon Dissociation (IRMPD) spectroscopy, which only requires minimal modifications of commercially available mass spectrometers as compared to other techniques. The performance of this approach was demonstrated for a variety of sugars. Yet, the technique may suffer from several drawbacks, in particular the long acquisition time and the need for expertise in laser spectroscopy to acquire and interpret the data.

During this presentation, efforts and improvements made on our setup to counteract these drawbacks will be presented as well as results coming from these enhancements. We hope that these efforts will make IRMPD spectroscopy faster³, easier to use, and a seamless extension of other analytical workflow^{1,4}, with the goal of facilitating sugar analyses.

Bibliographic references:

- 1) B. Schindler, 2017 *Nature Communications* 8, 973
- 2) E. Mucha et al, 2017 *Angewandte Chemie International Edition* 56, 11248–11251
- 3) O. Yeni et al, 2022, *Analyst*, 147, 312-317
- 4) B. Schindler et al, 2017 *International Journal of Ion Mobility Spectrometry* 20, 119–124