ELUCIDATING THE STRUCTURE OF SUGARS: MW SPECTROSCOPY COMBINED WITH ULTRA-FAST UV LASER VAPORIZATION

EMILIO J. COCINERO, PATRICIA ECIJA, FRANCISCO J. BASTERRETXEA, JOSÉ A. FERNANDEZ, FERNANDO CASTANO, *Departamento de Química Física, Facultad de Ciencia y Tecnología, Universidad del País Vasco (UPV-EHU), Ap. 644, E-48080 Bilbao, Spain*; ALBERTO LESARRI, *Departamento de Química-Física y Química Inorgánica, Facultad de Ciencias, Universidad de Valladolid, E-47011 Spain*; JENS-UWE GRABOW, *Institut für Physikalische Chemie, Lehrgebiet A, Universität Hannover, Callinstraße. 3A, D-30167 Hannover, Germany*; ALVARO CIMAS, *Laboratoire Analyse et Modélisation pour la Biologie et l'Environnement, Université d'Évry val d'Essonne, F-91025 Evry (France).*

Carbohydrates are one of the most versatile biochemical building blocks, widely acting in energetic, structural or recognition processes. Even the small monosaccharides display unique structural and conformational freedom and may coexist in many open-chain or cyclic forms. We recently initiated the investigation of a series of monosaccharides using a combination of ultrafast laser vaporization and microwave spectroscopy in supersonic jet expansions. We present several structural studies on carbohydrates of aldoses[a] and ketoses[b] of five and six carbon sugars vaporized by UV ultrafast laser vaporization and stabilized in a jet expansion. The experimental evidence confirms that sugars exhibits a α-/β-pyranose conformation (6-membered ring), sharply contrasting with the furanose form (5-membered ring) found in the nature (as component of RNA, sucrose). In addition, thanks to the use of enriched samples, we have experimentally determined the substitution and effective structures. Finally, the structure of several monosaccharides was compared and common structural patterns of their conformational landscape will be showed.

[a] E. J. Cocinero, A. Lesarri, P. Écija, F. J. Basterretxea, J. U. Grabow, J. A. Fernández and F. Castaño *Angew. Chem. Int. Ed.* **51**, 3119-3124, 2012.

[b] E. J. Cocinero, A. Lesarri, P. Écija, Á. Cimas, B. G. Davis, F. J. Basterretxea, J. A. Fernández and F. Castaño *J. Am. Chem. Soc.* **135**, 2845-2852, 2013.