UNDERSTANDING THE SHAPE OF β-D-ALLOSE: A LASER ABLATION ROTATIONAL STUDY[a].

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Allose, an aldohexose sugar, is a rare monosaccharide. It differs from the archetypal glucose in the hydroxyl group at the C3 position. However, this slight variation seems to be decisive in its natural abundance, as well as its biological role. Because of the structure-property relationship and to shed light on the effects of epimerization, we have brought β-D-allose into the gas phase using laser ablation techniques, and its conformational panorama has been characterized using chirped-pulse Fourier transform microwave (LA-CP-FTMW) spectroscopy. Three conformers have been unequivocally identified based on the spectroscopic rotational parameters. All the detected conformers exhibit a counter-clockwise arrangement (cc) network formed by an intramolecular hydrogen bond similar to what is observed in β-D-glucose. In opposition, we found that the intramolecular hydrogen bonds in β-D-allose are stronger than in β-D-glucose, which could have drastic biological implications.

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