CORELATION ^{13}C CHEMICAL SHIFT FOR OSELTAMIVIR

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Considered an acute and highly contagious viral respiratory infection, the influenza (Matos et al. 2018) affects millions of people in seasonal epidemics (Li et al. 2017) causes significant morbidity and mortality. A class of antivirals most widely used for influenza treatment, the neuraminidase inhibitors (NAIs), including oseltamivir (OST) (Matos et al. 2018), is one of the most important anti-influenza drugs (José M. Fraile and Carlos J. Saavedra 2017). When a solid compound exists in more than one crystalline form, we call it polymorphism (Lakshmi Prasanthi et al. 2016) with different arrangements or conformations in the crystal lattice (Raza et al. 2014). Can prove interesting for drug developers, polymorphic forms of drugs, because (Censi and Di Martino 2015) are responsible for differences in many properties (Raza et al. 2014) as in the bioavailability, manufacturability and stability of the product (Saifee et al. 2009) and are very common amongst drugs (Raza et al. 2014). Spectroscopy Nuclear Magnetic Resonance (NMR) has become an indispensable tool for the characterization of organic molecules, since the early 1960s (Kwan and Huang 2008). The combined experimental and simulated studies of NMR chemical shifts (δ) give more confirmation about the structure of the molecules. The NMR δ using quantum computational theories and compared with ^{13}C -NMR spectral data is studied (Hiremath et al. 2018). In this work we intend to correlation ^{13}C NMR scaled δ with experimental δ (D'Souza et al. 2009) of OST based on the application of scale factor. The δ calculations were computed at the mPW1PW91/6-31G(d) level, using the GIAO method, and were obtained in relation to the δ of the calculated TMS at the same level of theory (Cimino et al. 2004). The δ are obtained as $\delta_{\text{calc}} = \sigma_{\text{TMS}} - \sigma$, where σ_{TMS} is the isotropic shielding constant of the reference compound, tetramethylsilane (TMS), calculate at the same level of theory. The scaled δ (δ_{scal}) were obtained u the equation: $\delta_{\text{scal}} = 1.05.\delta_{\text{calc}} - 1.22$ (1) (Giacomello et al. 2017).

Figure 1. Structural representations of OST.

In order to achieve widespread application of a scaling factor to GIAO-HDFT ^{13}C δ , it is desirable to combine excellent accuracy of MAD (mean absolute deviation) and RMS (root mean square). The data comparison demonstrated a great agreement between experimental and calculated NMR δ . For OST molecule MAD and RMS before (after), in ppm, application of the scale factor are: 4.90 (3.82) and 6.77 (5.41). In conclusion,

GIAO-mPW1PW91/6-31G linear regression used to compare the experimental and the scaled data with the conformational analysis protocol, is a very attractive tool as an alternative to more computationally demanding approaches, which are usually applied in order to achieve ^{13}C NMR chemical shift calculations.

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