

Fragmentation of dihydrobenzofuran neolignans by electrospray ionization tandem mass spectrometry

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Key-words: neolignans, fragmentation, electrospray.

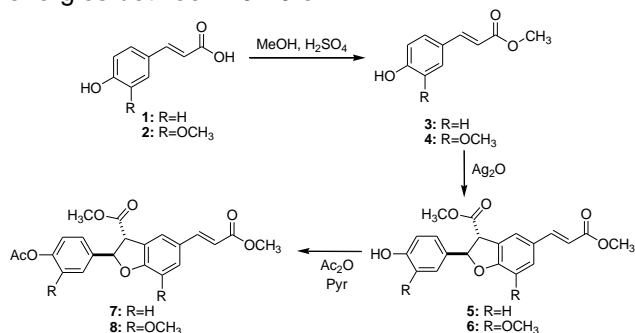
Introduction

Dihydrobenzofuran neolignans (DNL) displayed a variety of biological activities, such as tripanocidal and schistosomicidal¹. Currently, studies on the identification of these compounds from natural sources have been focused on the use of hyphenated techniques, such as liquid chromatography – mass spectrometry (LC-MS). However, the dereplication of DNL using LC-MS is still difficult due to shortage of fragmentation data on this class of compounds under electrospray conditions.

In this work, it has been presented a preliminary data about the fragmentation of some DBN employing electrospray ionization tandem mass spectrometry (ESI-MS/MS).

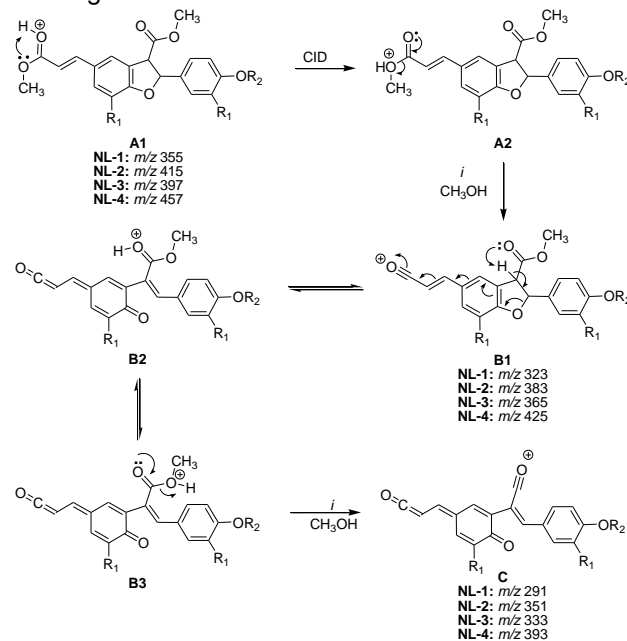
Results and Discussion

The DNLs investigated in this study were synthesized as previously described², solubilized at MeOH:H₂O (8:2) and infused directly on a Z-spray font in a QqQ spectrometer Xevo TQS (Waters). Tandem mass spectrometry analyses (MS/MS) were performed using N₂ as collision gas at collision energies between 10-40 eV.



Our results showed that the most intense peaks in the ESI-MS/MS spectrum were produced by two consecutive eliminations of methanol (32 u). Considering that the protonation takes place at the carbonyl oxygen of the α,β -unsaturated ester, the elimination of MeOH is preceded by proton migration to the ester oxygen atom, which occurs upon the collision-induced dissociation (CID) process. This proton migration increases the nucleofugacity of –OCH₃ group, which is eliminated as MeOH to produce the acylium ion **B1** (Figure 2). Elimination

of a second methanol molecule from **B1** is initiated by abstraction of α -carbonyl hydrogen, with consequent opening of the tetrahydrofuran ring and formation of the intermediate ion **B2**. This step is driven by an increase in the conjugation extension. Finally, a prototropism can convert **B2** into **B3**, from which the elimination of MeOH occurs to produce the fragment ion **C**.



Conclusions

The preliminar data reported here suggests that an opening of the dihydrofuran ring is involved in the elimination of the second methanol molecule from the precursor ion ($[M+H]^+$). Sequential mass spectrometry (MSⁿ) experiments using labeled-hydrogen and thermochemical data estimated by Computational Chemistry to prove the proposed ion structures are underway.

Acknowledgements

The authors would like to thank Fapesp (Proc. 2013/20094-0) and CNPq (Proc. 141883/2014-6)

¹ Pieters, L., et al, *J. Med. Chem.* **1999**, 42, 5475.

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