Synthesis of 2-*N*-Benzyl Carboxamide Derivates of 1-Azafagomine

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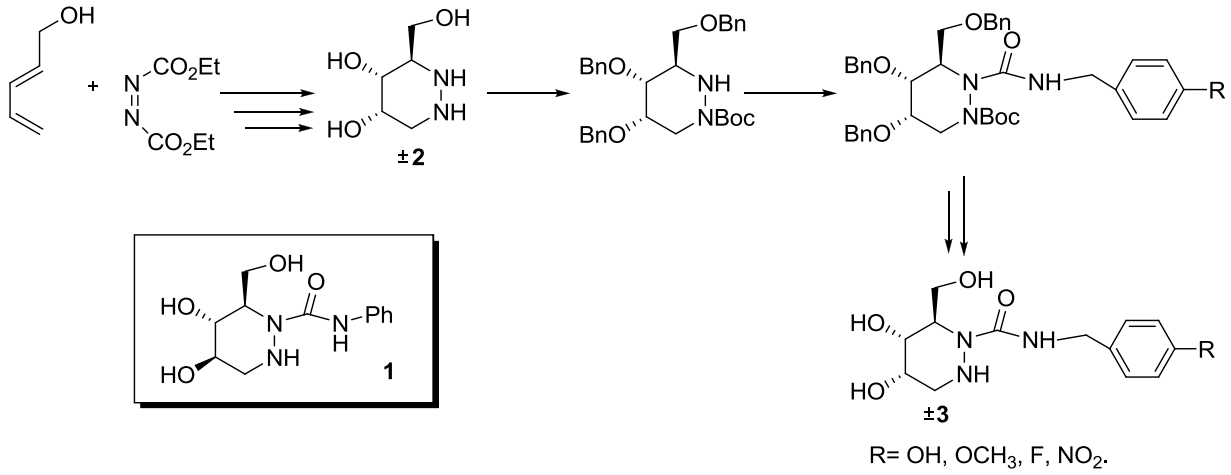
Imino sugars, also known as azasugars, are a group of compounds that have received a lot of attention in recent years because they typically exhibit excellent inhibitory properties over a range of enzymes involved in carbohydrate recognizing receptors, widely found in living organisms. [1] The inhibition of α- and β-glucosidases by 1-*N*-phenyl carboxamide derivatives of 1-azafagomine **1** was studied in our laboratory indicating that they are new leads for the synthesis of glycosidase inhibitors. [2]
Our objective now is to synthesise new 1-*N*-phenyl carboxamide derivates of 1-azafagomine **1** bearing groups at the *p*- position of the aromatic ring with ability to form extra hydrogen bonds. The interest of this structural modification is based on molecular modelling studies, which predicted a higher inhibitory activity for the final products.

The synthesis of the 1-*N*-benzyl carboxamide derivatives **4** can be achieved from 1-azafagomine **2**, which can be converted into the partially protected compound **3**.[3] The introduction of benzyl carboxamide groups at position 1 have been achieved by reaction of compound **3** with different isocyanates to afford compounds **4** to be tested against a panel of glycosidases.



Scheme 1: Synthetic strategy for compound **4**.

Acknowledgements:.

References:

[**1**] Alves, M. J., Azoia, N. G. (**2008**) In *Stereochemistry Research Trends*, Nova Science Publishers. [**2**] Alves, M. José Alves; Costa, Flora T.; Duarte, Vera C. M.; Fortes, António Gil; Martins, José A.; Micaelo, Nuno M., *J. Org. Chem.* **2011**, 76, 9584-9592. [**3**] Lopez, O.; Bols, M., *ChemBioChem* **2007**, 8, 657-661.

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Molecular dynamics Gibbs free energy calculations for CO2 capture and storage in structure I clathrate hydrates in the presence of SO2, CH4, N2, and H2S impurities

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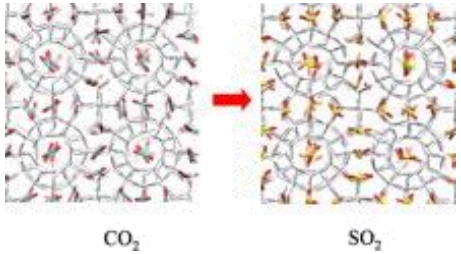

- Gibbs free energies of CO_2 substitution in the structure I hydrate with other guests are computed.
- Molecular dynamics based thermodynamic integration method is used.
- The pressure and temperature of the CO_2 substitution correspond with experimental hydrate synthesis conditions.
- SO_2 and H_2S are more stable in the structure I hydrate.
- The contributions to the electrostatic and van der Waals forces to the Gibbs free energies are evaluated separately.