Bicyklické sloučeniny odvozené z 1,3-diazetidin-2-onu

Bicyclic compounds derived from 1,3-diazetidin-2-one skeleton

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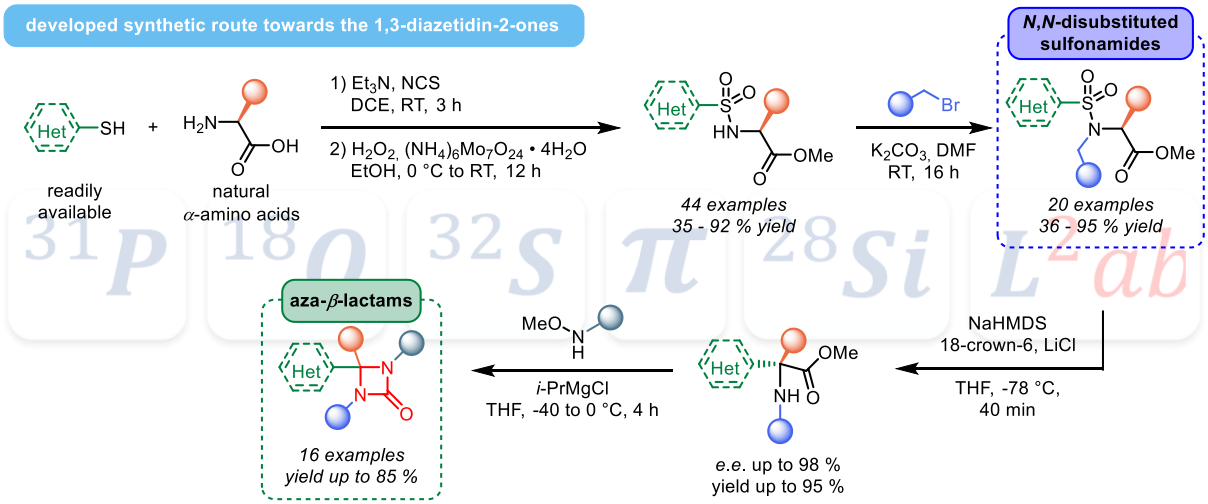
Recent increases in the penicillin-derived antibiotic resistance led to a further development of novel penicillin-derived compounds that would overrun the bacteria resistance. One of the solutions to the problem is to use aza-β-lactam-core containing structures that should by chemically resistant to bacterial enzyme responsible for the cell wall construction regeneration (H_2O-catalyzed enzyme release of already disactivated bacterial enzyme responsible for the bacterial wall construction).[1,2]

However, synthesis of such skeletons is rather rare in the literature and a library of possibly prepared compounds is rather narrow in both, number of compounds and their structural diversity. In our group we have recently developed a novel synthetic route to 1,3-diazetidin-2-one structures (for synthetic approach see, Kristek J., unpublished results) and the goal of this project is to adapt developed methodology to the synthesis of aza-β-lactam-like structures.



The aim of the theses is:

1) To write a literature review focused on the 1,3-diazetidin-2-ones: synthesis and the possible role in antibiotic resistance
2) To explore the synthetic route to bicyclic 1,3-diazetidin-2-ones
3) To characterize all prepared compounds with help of available characterization techniques

Litterature

(1) Chandrakala, P. S.; Katz, A. K.; Carrell, H. L.; Sailaja, P. R.; Podile, A. R.; Nangia, A.; Desiraju, G. R. Synthesis, X-Ray Crystal Structures and Biological Evaluation of Some Mono- and Bi-Cyclic 1,3-Diazetidin-2-Ones: Non-Natural -Lactam Analogues. *J. Chem. Soc., Perkin Trans. 1* **1998**, 2597–2608. https://doi.org/10.1039/A802438C.

(2) Mora-Ochomogo, M.; Lohans, C. T. β-Lactam Antibiotic Targets and Resistance Mechanisms: From Covalent Inhibitors to Substrates. *RSC Med. Chem.* **2021**, *12* (10), 1623–1639. https://doi.org/10.1039/D1MD00200G.