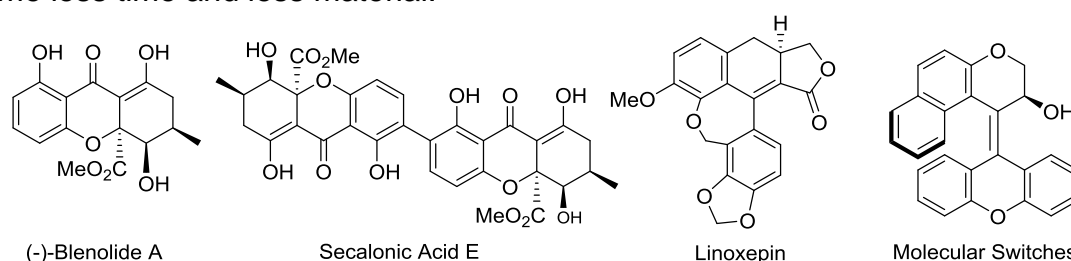


GDCh-Kolloquium in Mülheim an der Ruhr: Domino Reactions. The Green and Economical Art of Chemical Synthesis Lutz F. Tietze

Institute of Organic and Biomolecular Chemistry, Georg-August-University Göttingen,
Tammannstr. 2, D-37077 Göttingen, Germany,
For correspondence: Email: ltietze@gwdg.de

Abstract

The efficient synthesis of natural products, drugs, agrochemicals and materials is a very important aspect in academia and industry. To allow an ecologically and economically favourable approach in a green fashion the former stepwise procedures must be replaced by domino reactions which allow the preparation of complex molecules starting from simple substrates in a straight forward way. Domino reactions¹ allow the reduction of the amount of waste being formed and the preservation of our resources. Moreover, they are also favourable in an economical way since they consume less time and less material.



The usefulness of the domino concept^[1] is demonstrated with the syntheses of some fungal metabolites as blenolide A^[2] and secalonic acid E^[3] with a dimeric tetrahydroxanthenone skeleton using an enantioselective domino-Wacker/carbonylation/methoxylation reaction and of the natural aryldihydronaphthalene lignan linoxepine^[4] employing a domino-carbopalladation/Heck reaction. The approach has also been applied for the synthesis of novel materials such as molecular switches^[5a-e] and fluorescence dyes^[6a,b] using a domino-Sonogashira/carbopalladation/CH-activation reaction.

Keywords: Domino reactions; enantioselective synthesis; natural products; molecular switches; fluorescence dyes; Palladium; CH-activation.

References

- [1] a) Domino Reactions: Concepts for Efficient Organic Synthesis", Ed.: L. F. Tietze, Wiley-VCH, Weinheim, **2014**; b) L.F. Tietze, *Chem. Rev.* **1996**, *96*, 115-136.
- [2] a) L. F. Tietze, L. Ma, J.R. Reiner, S. Jackenkroll, S. Heidemann, *Chem. Eur. J.* **2013**, *19*, 8610-8614; b) L. F. Tietze, S. Jackenkroll, J. Hierold, L. Ma, B. Waldecker, *Chem. Eur. J.* **2014**, *20*, 8628-8635. c) S. Senthikumar, G. Valdomir, D. Ganapathy, Z. Yun, L. F. Tietze, *OrgLett* **2018**, 2186-2189.
- [3] a) D. Ganapathy, J.R. Reiner, G. Valdomir, S. Senthikumar, L.F. Tietze *Chem. Eur. J.* **2017**, *23*, 2299-2302; b) D. Ganapathy, J.R. Reiner, L.E. Löffler, L. Ma, B. Gnanaprakasam, B. Niepötter, I. Koehne, L.F. Tietze *Chem. Eur. J.* **2015**, *21*, 16807-16810.
- [4] a) L. F. Tietze, S.-C. Duefert, J. Clerc, M. Bischoff, C. Maaß, D. Stalke, *Angew. Chem.* **2013**, *125*, 3273-3276; b) L. F. Tietze, J. Clerc, S. Biller, S.-C. Duefert, M. Bischoff *Chem. Eur. J.* **2014**, *20*, 17119-17124.
- [5] a) L. F. Tietze, M. A. Düfert, F. Lotz, L. Sölter, K. Oum, T. Lenzer, T. Beck, R. Herbst-Irmer, *J. Am. Chem. Soc.* **2009**, *131*, 17879-17884; b) L. F. Tietze, M. A. Düfert, T. Hungerland, K. Oum, T. Lenzer, *Chem. Eur. J.* **2011**, *17*, 8452-8461; c) L. F. Tietze, T. Hungerland, M. A. Düfert, I. Objartel, D. Stalke. *Chem. Eur. J.* **2012**, *18*, 3286-3291; d) L. F. Tietze, T. Hungerland, C. Eichhorst, A. Düfert, C. Maaß, D. Stalke, *Angew. Chem., Int. Ed.* **2013**, *52*, 3668-3671; e) T. A. Khan, T. Fornefeld, D. Hübner, P. Vana, L. F. Tietze, *OrgLett* **2018**, 2007-2010.
- [6] a) L. F. Tietze, C. Eichhorst, T. Hungerland, M. Steinert, *Chem. Eur. J.* **2014**, *20*, 12553-12448; b) L. F. Tietze, C. Eichhorst, *Heterocycles* **2015**, *90*, 919-27.