

Synthesis of various N-heterocycles using the four-component Ugi reaction

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Abstract

Nowadays, among synthetic organic chemists, the Ugi four-component reaction (U-4CR), is known as the most important and useful isocyanide-based multicomponent reactions (IMCRs); since it allows the rapid and straightforward synthesis of the linear peptide backbone. U-4CR, actually is the condensation reaction involving, an isocyanide, an aldehyde, an amine, and a carboxylic acid leading to the formation of the corresponding adduct. Significantly, this adduct can be cyclized through a suitable posttransformation, resulting in the construction of different heterocyclic systems containing nitrogen. In this chapter, we try to underscore the use of post-Ugi transformation in the synthesis of various N-heterocycles with four-, five-, six-, and seven-membered rings as well as fused heterocycles bearing one or two heteroatoms.

Keywords: Ugi reaction, Nitrogen-containing heterocycle, Ugi adduct, Post-Ugi transformation, Cyclization, Multicomponent reaction, MCRs, β -lactams, Pyrrolidinones, Pyrrolidinediones, Pyrrolidine, Oxazole, Indolin-2-ones, Isoindoline-2-ones, Benzimidazoles, 2,5-Diketopiperazines, Quinolines, Isoquinolines, Benzoxazinones, Quinoxalinones, Benzazepines, Benzoxazepinones, Triazolobenzodiazepines, Spiroindolines