

Diastereoselective synthesis of functionalized spiro[indoline-3,2'-pyrrolizines] and spiro[indoline-3,3'-pyrrolidines] via multicomponent reactions

Jing Sun, Liang Chen, Hui Gong, Chao-Guo Yan

Yangzhou University, Yangzhou, China

1,3-Dipolar cycloaddition reaction of azomethine ylides with alkenes is one of the most extensive studied organic reactions. In these years, extensive studies have been performed on the employing 1,3-cycloaddition reactions of azomethine ylides for the synthesis of spirocyclic pyrrolidines, especially spiro[indoline-3,3'-pyrrolidines] and polycyclic derivatives. In these works, azomethine ylides were usually generated from the condensation of an amine with an carbonyl compounds such as aromatic aldehyde and isatins, followed by deprotonation of the iminium ion or prototropic shift of the imine. Herein, we described for the first time the *in situ* generation of new-type azomethine ylide by the reaction of α -amino acids with dialkyl acetylenedicarboxylates and its sequential 1,3-dipolar cycloaddition reaction. The three-component reaction of secondary α -amino acids including proline, sarcosine, thiazolidine-4-carboxylic acid with dialkyl acetylenedicarboxylate and 3-methyleneoxindoles in refluxing ethanol afforded the functionalized spiro[indoline-3,2'-pyrrolizines], spiro[indoline-3,3'-pyrrolidines] and piro[indoline-3,6'-pyrrolo[1,2-c]thiazoles] in good yields and with high diastereoselectivity. Furthermore, the similar multicomponent reactions containing primary α -amino acids such as glycine, alanine and phenylalanine resulted in (spiro[indoline-3,3'-pyrrolidine]-1'-yl)maleates.

