

## One-pot, three component reactions between isocyanides and dialkyl acetylenedicarboxylates in the presence of phenyl isocyanate: Synthesis of dialkyl 2-(alkyl/arylimino)-2,5-dihydro-5-oxo-1-phenyl-1H-pyrrole-3,4-dicarboxylate

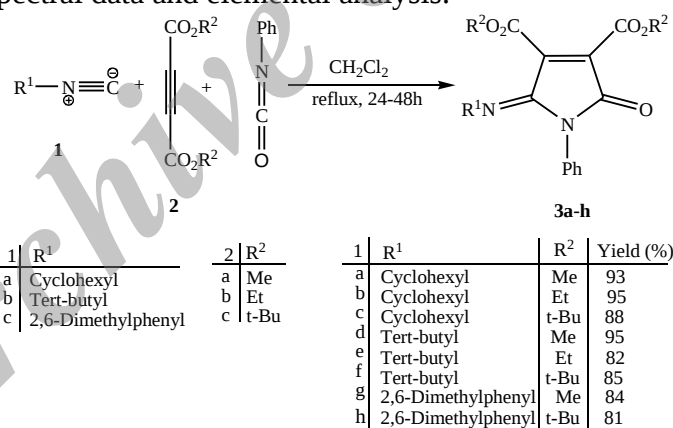
*Khatereh Khandan-Barani<sup>a\*</sup>, Malek Taher Maghsoodlou<sup>b</sup>, and Shirin Elmi<sup>a</sup>*

<sup>a</sup>Department of Chemistry, Islamic Azad University, Zahedan Branch, P.O. Box 98135-978, Zahedan, Iran

<sup>b</sup>Department of Chemistry, University of Sistan and Baluchestan, P. O. Box 98135-674, Zahedan, Iran

E-mail: [khatereh\\_baran@yahoo.com](mailto:khatereh_baran@yahoo.com)

Pyrrole derivatives are an important class of heterocycles. Nitrogen heterocycles are of synthetic interest because they constitute an important class of natural and non-natural product, many of which exhibit useful biological activity [1]. Isocyanide-based multicomponent reactions (IMCR) now occupy a position of importance in synthetic organic chemistry, mainly due to the contributions of Ugi and co-workers [2]. Organic isocyanates are powerful tools in organic synthesis [3-5]. Generally, isocyanates easily undergo polar cycloadditions with a large variety of unsaturated substrates [6]. The reactivity of nucleophilic carbenes such as isocyanides towards dimethyl acetylenedicarboxylate (DMAD) is well documented [7, 8]. In summary, we have found that the reaction of alkyl/aryl isocyanides with dialkyl acetylenedicarboxylates in the presence of phenyl isocyanate leads to the one-pot and simple synthesis of highly functionalized 2,5-dihydro-5-oxo-1-phenyl-1H-pyrrole derivatives. The structure of compounds **3a-h** was deduced from their IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR, mass spectral data and elemental analysis.



### References

- [1] J. F. Swinbourne, H. J. Hunt, G. Klinkert, *Adv. Heterocycl. Chem.* 1987, 23, 103.
- [2] A. Domling, I. Ugi, *Angew. Chem., Int. Ed.* 2000, 39, 3168.
- [3] *Ullmanns Encycl. Tech. chem.* 1957, 9, 1.
- [4] S. Ozaki, *Chem.Rev.* 1972, 72, 457.
- [5] G. L'abbé, *Synthesis.* 1987, 525.
- [6] H. Ulrich, *Acc. Chem. Res.* 1969, 2, 186.
- [7] T. R. Oakes, H. G. David, F. Nagel, *J. Am. Chem. Soc.* 1969, 91, 4761.
- [8] T. Takisawa, N. Obata, Y. Suzuki, T. Yanagida, *Tetrahedron Lett.* 1969, 3407.