



Microwave induced multicomponent synthesis of 2-pyrrolo-3'-yloxindoles through reaction of enaminone, isatin and phosphorus ylide

Silvio Cunha (PQ),^{1,2*} Raimundo Francisco dos Santos Filho (PG)^{1,2}

¹Instituto de Química, Universidade Federal da Bahia, Campus de Ondina, 40170-290, Salvador – BA

²INCT Energia e Ambiente, Universidade Federal da Bahia, Campus de Ondina, Salvador, BA, 40170-290, Brasil.

*e-mail: silviocd@ufba.br

Keywords: enaminones, pyrroles, heterocycles, microwave.

INTRODUCTION

The pyrrol and indol ring structures are quite common in natural compounds and unnatural derivatives with relevant biological activities. The synthesis of such structural scaffold combined in the same compound is a theme of ongoing interest.^{1,2} Bergman and coworkers reported the two component synthesis of 2-pyrrolo-3'-yloxindoles reacting 3-acetylindenoindole and enaminone in toluene under reflux for several hours. More recently, Powell and coworkers described the synthesis of one 2-pyrrolo-3'-yloxindole nucleus via tri-component reaction of 3-acetylindenoindole, ethyl acetoacetate and NH₄OAc under catalysis of ionic liquids in excellent yield. Multicomponent reaction (MCRs) are excellent strategies due its efficiency "one-pot", atom economy, reduced numbers of steps, with the use of simple molecules in order to obtain compounds with high degrees of complexity. Herein, we describe a tri-component reaction mediated by microwave radiation and without catalysis, which allowed the synthesis of densely substituted 2-pyrrolo-3'-yloxindoles.

RESULTS AND DISCUSSION

The reactions of isatins **1** with 1-phenyl-2-(1,1,1-triphenyl-λ-phosphanylidene) **2** in the presence of enaminones **3** were performed in a microwave reactor, in 20 minutes. This condition afforded the 2-pyrrolo-3'-yloxindoles in good yields, Figure 1. This tri-component reaction was tested at room temperature, but no reaction was observed even under prolonged reaction time. However, with six-membered enaminone **X**, only decomposition of reagents was observed in the tri-component condition. Derivative **X** was obtained in excellent yield in ethanol at room temperature.

CONCLUSION

A new and versatile tri-component approach to 2-pyrrolo-3'-yloxindoles was developed. Considering that the participation of 1-phenyl-2-(1,1,1-triphenyl-λ-phosphanylidene) in MCR is rare, the results of the

study amplifies the synthetic applications of such compound, as well as enaminones and isatins.

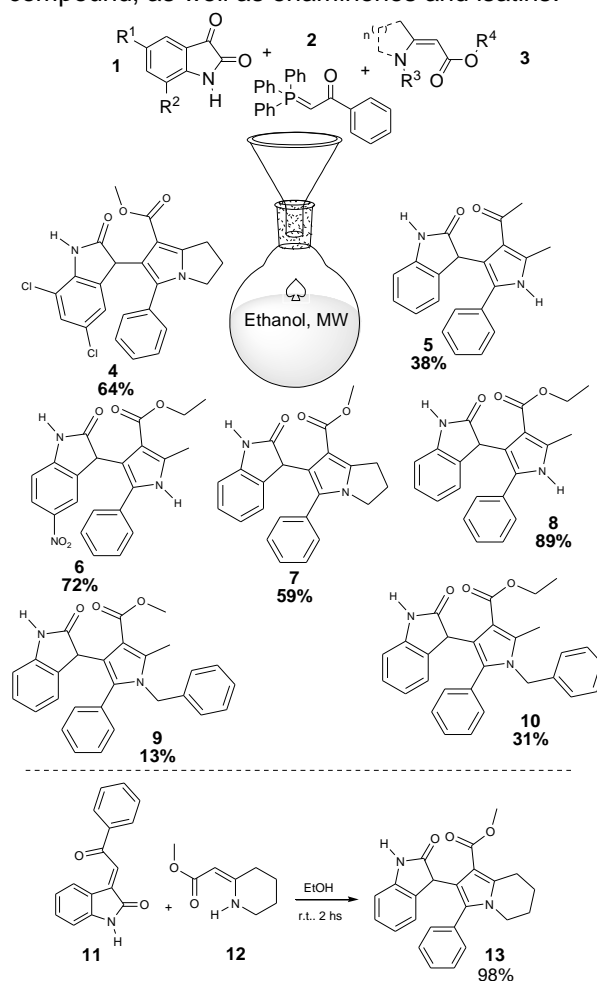


Figure 1. Synthesis 2-pyrrolo-3'-yloxindoles.

ACKNOWLEDGEMENTS

The authors thank CNPq, CAPES and FAPESB for the financial support.

REFERENCES

- Rehn, S. Bergman, J. *Tetrahedron*. 2005, 61, 3115-3123..
- Prodius, D., Macaev, F., Stingaci, E., Pogrebnoi, V., Mereacre, V., Novitchi, G., Kostakis, G. E., Anson, C.E. Powell, A. *Chem. Commun.* 2013, 49, 1915.