Solvent-free synthesis of substituted pyrroles *via* multicomponent reaction of primary amines

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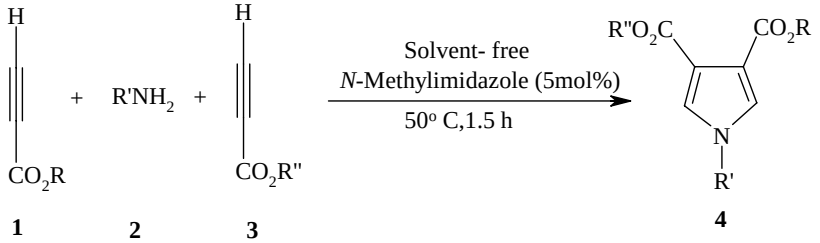
At the beginning of the new century, a move in importance in chemistry is obvious with the longing to extend environmentally gentle routes to a numerous of materials [1]. Green chemistry approaches hold out momentous potential not only for reduction of byproducts, a reduction in the waste produced, and lowering of energy costs but also in the development of new methodologies toward previously unobtainable materials, using existing technologies [2]. Of all of the existing areas of chemistry, medicinal and pharmaceutical chemistry, with their traditionally large volume of waste/product ratio, are maybe the most developed for greening [3]. The syntheses of pyrroles are by all means a gorgeous area in heterocyclic chemistry [4], due primarily to the fact that many pyrroles are subunits of natural products [5] and some are the building blocks for porphyrin synthesis [6]. A number of pyrrole derivatives have been shown to possess antidiabetic, fungicidal, or antibacterial properties. As part of our current studies on the development of new routes in heterocyclic synthesis, we report an efficient three component reaction between alkyl propiolate **1**, primary amines **2** and alkyl propiolate **3** in the presence of catalytic amount of *N*-methylimidazole at 50 oC under solvent-free conditions which lead to pyrrole derivatives **4** in good yield (Scheme 1).



1 **2** **3** **4**

Scheme 1.

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