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Microwave-assisted multicomponent syntheses of heterocyclic phosphonates

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Organophosphorus compounds play an important role in several fields of life; they have widespread use in organic and medicinal chemistry, as well as in agriculture and plastic industry. Over the last years, the chemistry of heterocyclic phosphonates has received an intensively growing interest. One of the most efficient tools for the preparation of these compounds is the synthesis via multicomponent reactions, which transformations meet several criteria of an “ideal synthesis”, such as high atom economy, fast and simple accomplishment, ability to save time and energy and being environment-friendly.

The synthesis of isoindolin-1-one-3-phosphonate derivatives was studied by the microwave(MW)-assisted three-component reaction of 2-formylbenzoic acid, aliphatic primary amines and various dialkyl phosphites. A suitable method was also developed for the preparation of the isoindolin-1-one-3-phosphonates at a “few g” scale by using a continuous flow MW reactor.

(2-Amino-4*H*-chromen-4-yl)phosphonates were also synthesized by the three-component condensation of salicylaldehydes, malononitrile and dialkyl phosphites under MW conditions.

Furthermore, 3,4-dihydropyrimidin-2(1*H*)-one phosphonates were prepared by the MW-assisted Biginelli reaction of β -ketophosphonates.