Synthesis of 5,6-dihydro-2H-pyran-2-ones (microreview)

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Abstract

5,6-Dihydro-2H-pyran-2-ones constitute an important class of heterocyclic compounds which also may be considered as α,β-unsaturated δ-lactones. These types of heterocycles have shown a wide range of biological and pharmacological activities including human antitumor, antifungal, antimicrobial, anti-inflammatory, antistress, antibiotic, antituberculosis, antimicrobial, antiviral; 5,6-dihydro-2H-pyran-2-ones are also known as the inducer of a colony stimulating factor in bone marrow stromal cells. All this made 5,6-dihydro-2H-pyran-2-ones more attractive both for chemists and pharmacologists. For example, (R)-rugulactone which was firstly reported in 2009 by Cardellina and coworkers possess interesting anticancer properties. In addition, 5,6-dihydro-2H-pyran-2-ones as chemical intermediates have widely been applied to the synthesis of numerous organic compounds including heterocycles. Nowadays, there are several synthetic routes to the preparation of these heterocycles including intramolecular cyclization, N-heterocyclic carbeneprecatalyst (NHC-precatalyst) reaction of enals and ketones, dicobaltocarbonyl-mediated tandem (5+1)/(4+2) cycloaddition, ring-closing metathesis of dienes containing carboxylate group by Grubbs II catalyst, (3+2) cycloaddition reaction, condensation reaction, and biosynthesis pathway. © 2016, Springer Science+Business Media New York.