

A Comprehensive Study on Synthesis of Heterocyclic Compound by Using Cyanoacetohydrazide Of Pyrazole

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Abstract: Use of cyanoacetohydrazides as precursors in reactions leading to construction of heterocycles is reviewed. In addition to some common heterocyclic compounds, synthesis of other uncommon heterocycles such as thiadiazole, oxadiazole, fused heterocycles, and some seven- and eight-membered heterocycles such as benzodiazepine, oxazepine, and benzoxocine starting with cyanoacetohydrazides and their derivatives is also reported. The main aim of this review is to show the application of cyanoacetohydrazides in heterocyclic synthesis via different types of reaction, including cyclocondensation and cyclization. The results are arranged in terms of the type of heterocycle formed, from five-, six-, seven-, to eight-membered and fused rings. This review aims to cover literature up to 2018, showing the distribution of publications involving use of cyanoacetohydrazides for preparation of heterocycles. This study reviewed the use of cyanoacetohydrazide as versatile precursor for synthesis of some heterocyclic compounds, as it contains five different functional groups (cyano group, No. 1, active methylene group, No. 2, carbonyl group, No. 3, amido group, No. 4 and hydrazine group, No.5) The reviewed reactions were classified according to the active centers of cyanoacetohydrazide involved. Accordingly, they are divided into 12 classes in which heterocycles was obtained via the utility of the following functional groups: a - groups No. 1, 2, b - groups No. 1,5, c - groups No. 2, 3, d - groups No. 2,4, e - groups No. 2,5, f- groups No. 3,5, g- groups No. 4,5, h- groups No. 1,2,5, i- groups No. 1,4,5, j- groups No. 2,4,5, k- groups No. 1,2,4,5, l-groups No. 2,3,4,5. This review covers literature up to 2021. This research project investigates the synthesis of heterocyclic compounds using cyanoacetohydrazides in one-pot reactions. Heterocyclic compounds are an essential class of compounds in medicinal chemistry, as they exhibit a wide range of biological activities. The use of cyanoacetohydrazides in a one-pot synthetic approach offers a versatile and efficient route to the construction of various heterocyclic systems. The project aims to explore different reaction conditions, mechanisms, and the potential of these reactions for creating new bioactive heterocycles.

Keywords: Cyanoacetohydrazides, Cyanoacetic acid hydrazide, Heterocycles, Cyclization.

