Green Synthesis of Medicinally Privileged Thio-Heterocycles

Stevens, Valeria (School: McAllen High School)

Since mid-eighties of the past century, a huge number of microwave-assisted organic/organometallic/inorganic transformations have been published with a growing number in every year. It is well known that microwave directly heats the reaction mixture without heating the glass wall of the reaction vessel. Thus the ‘local heating’ is avoided in microwave-induced chemical synthesis. By the use of microwave-assisted irradiation technology the formation of the unwanted byproducts (wastes) is reduced/stopped and the desired product is obtained in high yield. Because of several advantages, the use of microwave to achieve various chemical transformations is considered as green technology (green technique). In our laboratory, we have developed a simple, expeditious, and scalable green method to synthesize two important pharmacophores namely, 1,3-thiazolidin-4-ones and benzothiazepinones concurrently from diversely substituted mono- and polycyclic amines, aldehydes and thioglycolic acid. All the reactions were carried out under neat conditions. Mechanistic investigation revealed that the reaction could follow both the ways: (i) condensation of the thioglycolic acid to the imine and (ii) condensation of an aldehyde to the amide derived from thioglycolic acid and the amine. Although both the routes have been proved to be effective, the later produced higher yield.