Isothiazole is a relatively new ring system. Since the first study on mononuclear isothiazoles in 1956, this ring system has attracted considerable attention. The rapid expansion in the knowledge of the chemistry of isothiazoles has led to the synthesis of isothiazole derivatives as potential biologically active molecules. The synthesis of a variety of isothiazole analogues of natural products and physiologically active compounds has been reported and several useful biological activities have been encountered in various isothiazole derivatives.

Among isothiazole derivatives, the study of aminoisothiazoles has, hitherto, received only a scant attention. Since amino heterocycles, in general, are of intrinsic medicinal interest, a study on the synthesis of 4,5-disubstituted 3-aminoisothiazoles was undertaken. The cyclization of the appropriate nitrile precursors, such as the α-cyanothionoacetic acid derivatives, β-mercaptoacrylonitriles and α-cyanoketene thioacetals, has been found to be a versatile route to the synthesis of a variety of 4,5-disubstituted 3-aminoisothiazoles.

The α-cyanothioamides and α-cyanoketene thioacetals, employed as the starting materials in the synthesis of
3-aminoisothiazoles, were also exploited for the synthesis of some 3-aminothiophenes. The preparative methods of the \( \alpha \)-cyano- and the related \( \alpha \)-functionalized thionoacetic acid derivatives and ketene thioacetals and their application in heterocycle syntheses have been reviewed.

Nitriles are known to undergo a variety of reactions under acid catalysis. Halogen acids have been found to be particularly effective catalysts in the reactions of nitriles with simple nucleophiles, in the intramolecular cyclizations of functionalized nitrile derivatives and in the intermolecular condensations with bifunctional substrates leading to heterocycle formation. The halogen acid catalysed condensation of nitriles with \( \alpha \)-aminocarbonyl compounds, such as the \( \alpha \)-aminoesters, \( \alpha \)-aminoamides, \( \alpha \)-aminonitriles and \( \alpha \)-aminoketones, was studied and has been found to be a facile and versatile method for the synthesis of quinazolines and a variety of condensed pyrimidines.

The UV, IR, NMR and Mass spectral characteristics of some of the aminoisothiazoles, aminothiophenes and condensed pyrimidines synthesized are discussed.