INTRODUCTION

Synthesis of Isothiocyanates

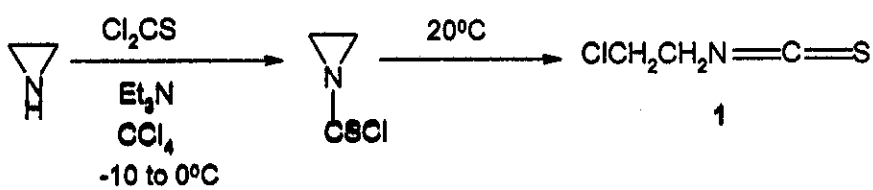
Isothiocyanates can be prepared by various procedures, the choice of which would depend on the target molecule. Heterocyclic isothiocyanates were obtained by the methods in vogue for the synthesis of alkyl, aryl, and acyl isothiocyanates. [1, 2]

A) From Heterocyclic Reagents with Ring Cleavage :

Some heterocyclic reagents have been used as intermediates for the synthesis of different isothiocyanates.

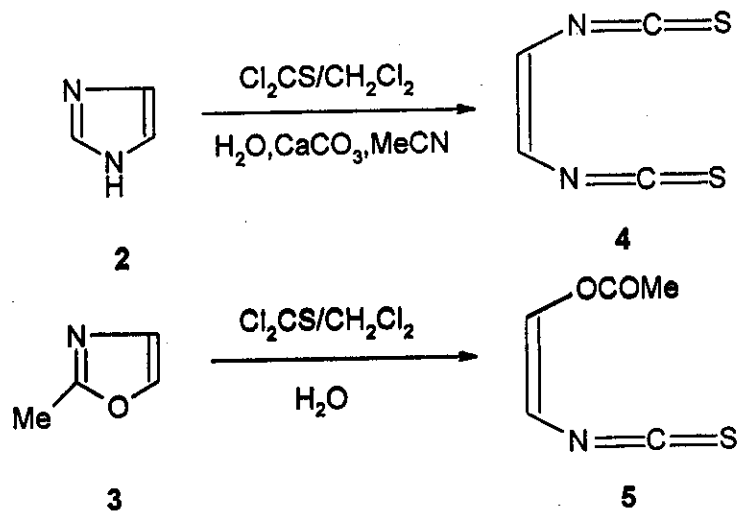
1. Reaction of Heterocycles with Thiophosgene:

Generally nitrogen and oxygen heterocycles undergo facile cleavage with thiophosgene. For example, the cleavage of aziridine with this reagent furnished 2-chloroethyl isothiocyanate **1** in a good yield [3] (Scheme 1).



Scheme 1

Imidazole **2** and 2-methyloxazole **3** undergo heterolytic ring cleavage with thiophosgene to the corresponding isothiocyanates **4** and **5** respectively, as shown in (Scheme 2). [4-6] Also, Benzoxazole and benzimidazole afforded similar products. [7]

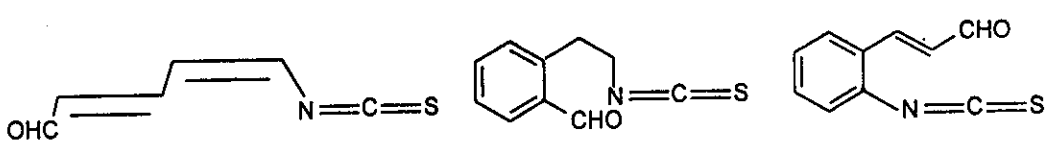


2 4

3 5

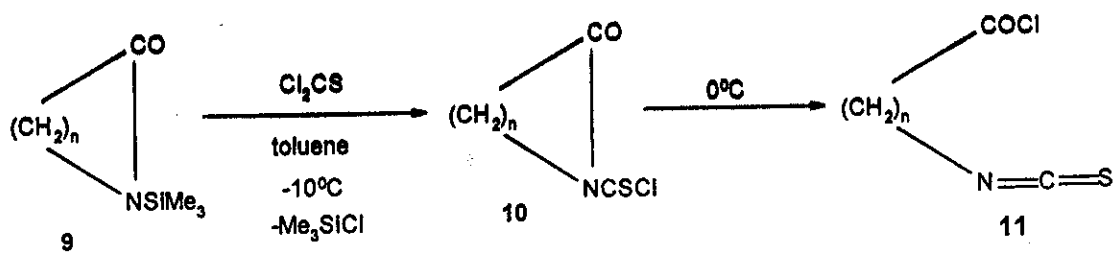
Scheme 2

The reaction of pyridine, quinoline, and isoquinoline [8, 9] with thiophosgene led to the formation of isothiocyanates **6-8** respectively.



6 7 8

N-Trimethylsilyl lactams 9 reacted with thiophosgene to give the N-chlorothiocarbonyl derivative **10** which underwent ring opening, affording ω-isothiocyanatocarboxylic acid chloride **11** in a good yield [10] (Scheme 3).



9 10 11

Scheme 3