

SYNTHESIS OF SULFUR-CONTAINING BICYCLIC  $\beta$ -LACTAMS  
USING 1-AZADIENES AS A SYNTHETIC BLOCK

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Development of synthetic routes to functionalized heterocycles is of great importance and we found azadienes, nitrogen analogs of butadienes, are effective heterocyclic synthons for such purpose. For example, we have reported utilization of azadienes in syntheses of 3- to 5-membered rings having an alkenyl or imidoyl group, pyridines, pyridones, thiazoles, and isothiazoles. In this report, we studied syntheses of sulfur-containing bicyclic  $\beta$ -lactams (thiaalkanams and thiaisoalkanams) using 1-azadienes as a synthetic block.

Reaction of  $\text{SCl}_2$  with the bis(alkenyl)- $\beta$ -lactam 2, prepared from the 1-azadiene 1a, using high dilution method gave the thiaisoheptanam 3a in a good yield along with the hydrolyzed product 3b. Similarly the  $\alpha$ -methylene- $\beta$ -lactam 4 afforded the thiaisoheptanams 5 and 6. Furthermore, the *N*-allyl- $\beta$ -styryl- $\beta$ -lactam 7, prepared from the *N*-silylazadiene 1b, reacted with  $\text{SCl}_2$  to give the thianonanams 8 and 9.

