Shiraz University
Faculty of Sciences

Ph.D. Dissertation in Organic Chemistry

New Approaches to 2-Azetidinones Using Acid Activators, Polymer Supported-Ketene and Their *N*-Dearylation to *N*-Unsubstituted β-Lactams

By
Maaroof Zarei

Supervised by
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SEPTEMBER 2009

IN THE NAME of GOD

In the Name of God

DECLARATION

Hereby, Maaroof Zarei (843814) student of Organic Chemistry College of Sciences certify that this thesis results from my own research and whenever I have utilized other sources, I have clearly reference them. I also declare that the research and the title of my thesis are novel and I promise, without the permission from the university, the results never be published or bring to someone else. The copyright of this thesis is the property of Shiraz University.

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Dedicated to:

My Family

And

My Teachers

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ABSTRACT

New Approaches to 2-Azetidinones Using Acid Activators, Polymer Supported-Ketene and Their *N*-Dearylation to *N*-Unsubstituted β-Lactams

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In this thesis, the one-step Staudinger reaction of substituted acetic acids and imines for the synthesis of β-lactams using the Vilsmeier reagent (chloro methylenedimethylammonium chloride) has been reported.

Also alkoxy methylene-*N*,*N*-dimethyliminium salts have been used for the synthesis of β-lactams from imines and carboxylic acids in mild conditions.

p-Ethoxyphenyl group has been introduced to 2-azetidinones skeleton as a suitable *N*-protective group which can be easily removed by CAN under mild reaction conditions.

We also developed a solution phase to "on-column" *N*-dearylation of β-lactams using silica supported ceric ammonium nitrate (CAN-SiO_2). Both *N*-dearylation and purification was performed at the same time in this method.

Solvent-free methods for *N*-dearylation of 2-azetidinones in solid-solid phase by grinding with CAN or CAN-SiO_2 have been also demonstrated.

Another part of this study involves polymer-supported synthesis of 5-carboxyl-phthalimido β-lactams and 3-amino-β-lactams *via* Merrifield resin-bound phthaloylglycine.

TABLE OF CONTENT

LIST OF TABLES

TABLE **PAGE**