MASTER'S THESIS

Unsaturated sulfoxides in organic synthesis: a new furan synthesis and total synthesis of isoquinolone alkaloids

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Unsaturated Sulfoxides in Organic Synthesis: A New Furan Synthesis and Total Synthesis of Isoquinolone Alkaloids

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Abstract

α,β-Unsaturated sulfoxide (I) was demonstrated to be a versatile synthetic intermediate. A new synthesis of furans (II), and the total synthesis of four naturally occurring isoquinolone alkaloids, 6,7-dimethoxy-2-methylisocarbostyril (III), doryanine (IV), N-methylcorydaldine (V) and oxyhydrastinine (VI), have been achieved in the present work.

In the furan synthesis, ketoesters were first reacted with a phenyl alkenyl sulfoxide. Pummerer rearrangement of the Michael addition product followed by intramolecular trapping of the sulfenium ion intermediate by the keto group afforded dihydrofuran VII. Further manipulations on VII yielded aromatic furans (II).

In the total synthesis of isoquinolone alkaloids, methyl amine was first reacted with a phenyl alkenyl sulfoxide by Michael addition to form compound VIII. The sulfoxide IX was then formed by reaction between the Michael addition product and benzoic acid X. Thereafter the sulfoxide IX was subjected to the Pummerer rearrangement to yield α-acetoxy sulfide XI. Cyclization of intermediate XI in trichloroacetic acid followed by Raney nickel reduction led to the formation of the natural products N-methylcorydaldine (V) and oxyhydrastinine (VI). With *p*-toluenesulfonic acid, the fully aromatized isoquinolones , 6,7-dimethoxy-2-methylisocarbostyril (III) and doryanine (IV), could be formed directly from intermediate XI.

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