SYNTHESSES OF SPIRO COMPOUNDS RELATED TO ERYTHRINA ALKALOID

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The report described several new synthetic routes to spiro-type compounds related to erythrina alkaloid which is known as having curare-like action. Our method synthesizing erythrinans utilizes one of the following three reactions of dioxopyrroline derivatives.

1. Erythrinans by Intramolecular Nucleophilic Cyclization of Dioxopyrroles.

A dioxopyrrole on treatment with acid easily cyclized to yield an erythran. The 10 compounds of rings A and C variants were prepared by this method in yield of 50-100%. As a cyclizing reagent, PPA and anhy.\(\text{H}_3\text{PO}_4\) are the most general, but sometimes PPE, BF\(_3\)-Et\(_2\)O, and AgClO\(_4\) are superior.

\[
\begin{align*}
1 & \quad \text{A} \quad \text{B} \\
2 \quad \text{Ar} \quad \text{N} \quad \text{O} \\
3 \quad \text{(n=5,6,7)} \quad \text{Ar} \quad \text{N} \quad \text{O}
\end{align*}
\]

II. Erythrinans by Cycloaddition of Activated Butadienes to Dioxopyrroles.

1) 1,4-Cycloaddition

Thermal cycloaddition of the dioxopyrrole 4 and 2-silyloxybutadienes proceeded with regio- and stereoselective manner to give 1,4-cycloadducts possessing various functional groups (R' = H, OMe, OTMS) on ring C in good yield.

2) 1,2-Cycloaddition followed by Thermal 1,3-Rearrangement.

Photocycloaddition of the butadienes with 4 gives regioselectively the 1,2-cycloadduct 5, which thermally rearranges to the erythrinans 7 (R' = H, OMe), regio-isomers with the Diels-Alder adducts 6, respectively.

Thus, we developed new three very effective methods synthesizing various spiro-type compounds related to erythrina alkaloid.