SYNTHESIS AND REACTIONS OF PYRROLIDINE DERIVATIVES FROM SUCCINIMIDE

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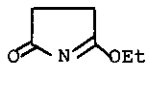
Some developments of pyrrolidine chemistry using O-ethylsuccinimide (1) and 5-ethoxy-2-pyrrolidinone (2) are described.

1. The reaction of 1 with various amines afforded keto-amidines (3) in satisfactory yields (15 examples). In the case of anthranilate and o-acylanilines as amine, quinazolones and quinazolines (4) having propionic acid ester at 2-position were derived via keto-amidines in the same reaction-vessel by successive addition of the reagents (5 examples).
2. 1 was found to be an efficient reagent for the introduction of 3-ethoxycarbonyl-propionyl group ($-COCH_2CH_2COOEt$) to aromatic compounds, that is, the reaction of 1 with aryllithium afforded 4-aryl-4-oxobutyrate (5) by a single operation under mild conditions (6 examples).
3. The substitution reaction of 2 with nucleophiles (amines, carbamates, amide, indole, and diethylaniline) was found to be a preferable synthetic method for 5-substituted-2-pyrrolidinones (6-9) (10 examples).
4. Jatropham (10), an antitumor alkaloid from Jatropha macrorhiza [Euphorbiaceae], was conveniently synthesized by 4-steps from 2. Its 4-methyl isomer (11), which was proposed for jatropham before, was also synthesized by the regioselective reduction of methylmaleimide with $NaBH_4/H^+$.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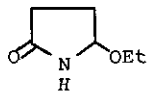
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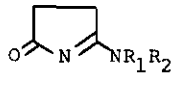
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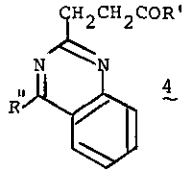
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$RCOCH_2CH_2COOEt$
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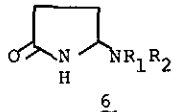
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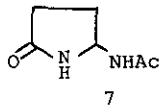
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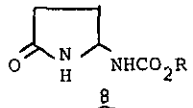
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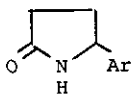
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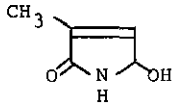
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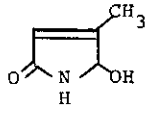
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