A NOVEL RING TRANSFORMATION OF IMIDAZOLES TO PYRIMIDINES

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During the course of our study on the synthesis of imidazole derivatives, we have observed high reactivity of the 5-position of 4-ethoxyimidazoles(1) toward electrophiles. By extending this work we found a novel ring transformation of (4-ethoxyimidazol-5-yl)maleates(3) to (6-ethoxycarbonyl-4-oxo-pyrimidin-5-yl)acetates(4). Compounds of this type are otherwise inaccessible and were shown to be valuable intermediates for the synthesis of pyrido[3,4-d]-pyrimidine-6,8-diones(7).

Compound 1 easily reacted with dimethyl acetylenedicarboxylate to afford Michael-adducts, (4-ethoxyimidazol-5-yl)fumarates(2) and -maleates(3). Mild acid treatment of 2 gave 3. Further acid treatment of 3 afforded 4. The structure of 4 was determined on the basis of analytical, NMR- and mass-spectroscopic data, and a sequence of degradation reactions as well. The mechanism of the transformation reaction will be proposed. Methylation of 4a with methyl iodide resulted in the formation of the O-methyl derivative(5a). Hydrolysis of 5a followed by dehydration with acetic anhydride gave the cyclic anhydride(6a). The synthesis of 7a, which was not produced by treatment of 6a with benzylamine, was accomplished by the reaction of 5a with trimethylaluminum and benzylamine.