

## DISSERTATIONES

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*Croat. Chem. Acta* 34 (1962)**The Reaction of Ureido Esters with Acid Anhydrides**

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The reaction of acetic anhydride with  $\alpha$ - and  $\beta$ -ureido esters was studied. Some substituted ureido esters of the type  $RCH(NHCONHR')$  ( $(CH_2)_nCO_2Et$  ( $R=H, CH_3, (CH_2)_2CHCH_2, C_6H_5$ ;  $R' = C_6H_5, 1-C_{10}H_7, n-C_4H_9, n-C_6H_{13}, n=0$  or  $1$ ) were prepared and subjected to the reaction with boiling acetic anhydride. It was shown that no cyclization to the expected dihydroureacils or dihydrooxazines occurred. Carbon dioxide and the corresponding  $N,N$ -diacetyl- and  $N$ -acetyl-aminoesters, and  $N,N$ -diacetyl- and  $N$ -acetyl-amines were identified as the reaction products.  $N,N$ -Diacetyl- and  $N$ -acetyl-aminoesters were also prepared from the corresponding amino and  $N$ -carbonyl-esters. By analogous reactions with propionic anhydride  $N,N$ -dipropionyl- and  $N$ -propionyl-amino derivatives were obtained. A satisfactory separation of  $N,N$ -diacyl- from  $N$ -acyl-amino derivatives was achieved by chromatography on a charcoal-celite column.

The mechanism of the reaction was studied using  $^{14}C$ . It was established that the carbon dioxide evolved in the reaction of acetic anhydride with ethyl  $\beta$ -[3-(1'-naphthyl)-ureido-2- $^{14}C$ ]-butyrate originates from the carbonyl of the ureido group. As an intermediate in the reaction of  $\beta$ -ureido esters with acetic anhydride, a mixed carbaminic-carboxylic anhydride has been presumed. The IR- spectra of  $N,N$ -diacetyl- and  $N$ -acetyl-amino derivatives are given and discussed. The properties of

the obtained  $N,N$ -diacylamino esters are described. Ethyl  $N,N$ -diacetyl- $\beta$ -amino butyrate was reduced with  $LiAlH_4$  to  $N,N$ -diethyl-3-amino butanol-(1).

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1. The Reaction of Ureido Esters  
with Acid Anhydrides

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Acetic Anhydride  
Butanol-1, 3-d ethylamino-,  
Butyric acid, Et ester,  
 $\beta$ -diacetylamino-,  
Butyric acid, Et ester,  
 $\beta$ -dipropionylamino-,  
Butyric acid, Et ester,  
 $\beta$ -propionylamino-,  
Diacetamides  
LiAlH<sub>4</sub>  
 $\delta$ -Methyl-hexanoic acid, Et ester,  
 $\beta$ -diacetylamino-,  
Naphthylamine-1,  
N,N-dipropionyl-,  
Propionic acid, Et ester,  
 $\alpha$ -diacetylamino-,  
Propionic Anhydride  
Ureido esters, substituted-,