

## ANODIC OXIDATION OF N-ALKYL-LACTAMS

Makoto Okita, Kunihiro Irie, Takeshi Wakamatsu, and Yoshio Ban

Faculty of Pharmaceutical Sciences, Hokkaido University, Sapporo, 060 Japan

Recent publications on the anodic oxidation of N-acylazacycloalkanes<sup>1</sup> and other related compounds<sup>2-4</sup> mostly concerned with alkoxylation at the carbon atom  $\alpha$  to nitrogen, prompts us to report our results on the electrochemical oxidation of N-alkyl-lactams, which provided the  $\alpha$ -hydroxylated compound as the major product along with the corresponding imide by further oxidation at the same position. This reaction was also applied to the new synthesis of heterocyclic compounds, which will be presented in this report.

### (1) Anodic oxidation of N-alkyl-lactams

The anodic oxidation of N-alkyl-lactams occurred regioselectively at the endocyclic carbon atom  $\alpha$  to nitrogen in five- and six-membered rings, and at the exocyclic  $\alpha$ -carbon atom in seven-membered rings to provide hydroxy-lactams, imides, and dealkylation products. These results present a striking contrast to those provided by Mitzlaff et al.,<sup>1</sup> who state that the anodic oxidation of N-alkyl-lactams carried out in a R'OH solution furnishes the exocyclic alkoxyated lactams, but does not give the endocyclic oxidized material, unless the substituent at the nitrogen is either of H, secondary or tertiary alkyls.

### (2) A new synthesis of bicyclo-[1,3]oxazine derivatives by anodic oxidation

There will be reported a new synthesis of bicyclo-tetrahydro-[1,3]oxazine derivatives from five- and six-membered lactams by anodic oxidation, followed by simultaneous cyclization.

### (3) A new lactonization by anodic oxidation. A formal synthesis of ( $\pm$ )-eburamonine

The anodic oxidation of 2-piperidinone-5-acetic acid derivative provided the lactam-lactone in good yield. It was found that the lactam-lactone obtained by this new lactonization method was converted to a useful intermediate in the Wenkert's synthesis of an indole alkaloid, ( $\pm$ )-eburnamonine.

References 1) M. Mitzlaff, K. Warning, and H. Jensen, Annalen, 1978, 1713.

2) M. Finkelstein and S. D. Ross, Tetrahedron, 1972, 28, 4497

3) T. Shono, H. Hamaguchi, and Y. Matsumura, J. Amer. Chem. Soc., 1975, 97, 4264.

4) K. Nyberg and R. Servin, Acta Chem. Scand. (B), 1976, 30, 640.