CHEMICAL TRANSFORMATION REACTION OF INDOLE ALKALOID TO 2-ACYLINDOLE ALKALOIDS

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Reaction of ethyl chloroformate with yohimbine in EtOH-$CHCl_3$ in the presence of Na_2CO_3 gave an epimeric mixture of 3-(R)- and 3-(S)-ethoxy-Nb-ethoxycarbonyl-3,4-seco-yohimbine with the cleaved C/D quinolizidine ring. On similar treatment both dihydrocorynantheine and hirsutine (C_3-epi-dihydrocorynantheine) gave the same products, 3-(R)- and 3-(S)-ethoxy-Nb-ethoxycarbonyl-3,4-seco-derivatives, only the epimeric ratios being different. The yohimbine-derived urethane, either a single epimer at C_3 or a epimeric mixture, was converted to a 2-acylindole derivative (3-oxo-Nb-ethoxycarbonyl-3,4-seco-yohimbine) through a 7-chloroindolenine derivative on treatment with t-BuOCl and subsequent hydrolysis with acid or alumina catalysts. A similar oxidation to 2-acylindole was successfully made on the urethane derived from dihydrocorynantheine or hirsutine. By making use of these general ring opening and oxidation reactions to form 2-acylindoles, hirsutine was chemically transformed to dihydrobrunamicine. Furthermore, a partial synthesis of the natural indole alkaloid, burnamicine itself, from geissoschizine methylether is in progress.

Successive treatment of hirsutine (having a cis-quinolizidine system) with $Pb(OAc)_4$ and CH_3I followed by hydrolysis with aq.HOAc—NaOAc then gave a 2-acylindole derivative (3-oxo-Nb-methyl-3,4-seco-hirustine), which was also prepared from dihydrocorynantheine by the same manner as already described for the partial synthesis of dihydrobrunamicine by Dolby and Sakai.