A STEREOSELECTIVE SYNTHESIS OF THE COMPOUND HAVING PALUSTRINE STRUCTURE

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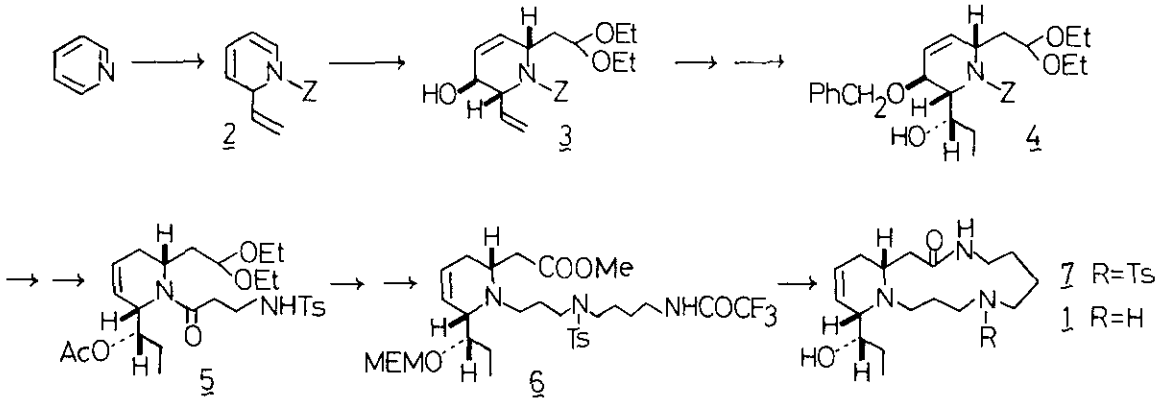
The horsetail alkaloid, palustrine has been assigned the structure (1) as a macrocyclic spermidine derivative, one of the polyamine functions being incorporated into a 2,6-cis disubstituted tetrahydropyridine ring.[1] Our oxygenative nucleophile introduction reaction (2→3) furnished a suitable starting material (3) with appropriately functionalized 2,6-cis-dialkyl side chains, and a series of reaction steps involving (i) stereocontrolled formation of the α-hydroxylpropyl side chain (3→4), (ii) regioselective introduction of the double bond in the piperidine moiety (4→5), and (iii) formation of spermidine unit (5→6), followed by ring closure to the thirteen-membered lactam derivative (7) provided a stereoselective synthesis of the compound having palustrine structure (1), whose IR and PMR spectra were found to be different from those of palustrine. Structure of 7 was confirmed by the X-ray analysis, which also demonstrated that all three alkyl side chains from tetrahydropyridine ring were situated in the pseudoaxial orientation in order to form hydrogen bonding between the hydroxyl group and the lactam oxygen atom.



1) P.C. Wälchli, G. Mukherjee-Müller, and C. H. Eugster, Helv. Chim. Acta, 61, 921 (1978).