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CONVERSION OF RHOEADINE METHIODIDE INTO THE ALKALOID PESHAWARINE

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The Emde degradation of rhoeadine methiodide (4.MeI) afforded the acetal 5 from which racemic peshawarine (1) was prepared.

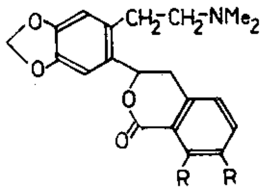
A short time back the alkaloid peshawarine (1) was found in *Hypecoum parviflorum* Kar. & Kir. (Papaveraceae). This is a member of a new isoquinolinobenzopyran group of isoquinoline alkaloids. The analog 2 was prepared from (±)-canadaline (3).[1]

An attempt was made to prepare peshawarine (1) by a simple reaction process proceeding from rhoeadine (4). The Emde degradation of rhoeadine methiodide (4.MeI) yielded a mixture of an optically active substance 5 (29.6%) besides the optically inactive alcohol 6 (49.7%).[2,3]

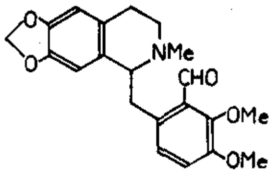
Dedicated to Professor Tadeus Reichstein, Basel, Switzerland, to his seventy-fifth birthday.

Acid hydrolysis (0.1M HCl) of the compound 5 gave the substance 7 (73.5%), m.p. 187-189° (acetone). ^{1}H-NMR (δ, $CDCl_3$) 2.28s ($N(CH_3)_2$), 2.3-3.2m (6H), 5.48q, $/J_{AX}+ J_{BX}/$ = 14.5 Hz (5-H), 5.90s ($O-CH_2-O$), 5.99q, J_{gem} = 1.5 Hz ($O-CH_2-O$), 6.18s (6-H), 6.60s (1-H), 6.65d and 6.72d, J_{ortho} = 9.0 Hz (9,10-H), 6.92s (4-H). UV (EtOH) λ_{max} 240 and 293 nm (logε 4.00 and 3.92). MS m/e 385 (4.5, M^+), 367 (0.7), 222 (1.1), 220 (0.5, 222 - H_2), 177 (0.7), 164 (1.4), 163 (1.5, 164 - H), 135 (1.0), 58 (100). During that reaction racemization took place. Oxidation of the hemiacetal 7 in acetone by an aqueous chromic acid solution[4] gave a compound of m.p. 201-203° (methanol) (80.2%) which on the basis of IR (1725 cm^{-1}), ^{1}H-NMR and UV spectra was identical with peshawarine (1). MS m/e 383 (3.0, M^+), 190 (0.8, $C_{11}H_{12}NO_2$), 163 (1.0), 162 (0.8), 135 (0.6), 134 (1.6), 58 (100). The mass spectrum of the original peshawarine[1] (1) and of our racemic product 1 exhibited an ion of m/e 190 as expressed by structure a. We assume that the origin of the ion a may be explained by migration of the N-methyl group to the lactóne oxygen whereupon the formation of an isoquinoline system takes place.

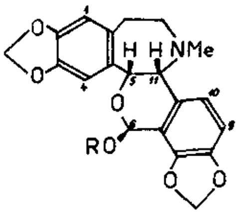
The alcohol 8 which was prepared by reduction of peshwarine (1) with $LiAlH_4$[1] is identical with the product of the Emde degradation of rhoeagenine methiodide (9.MeI) by its m.p. comparison.[3] The Emde degradation of the compound 4.MeI gave, in addition to the substances 5 and 6, a new product 10 of m.p. 111-114° (acetone), (20.9%). ^{1}H-NMR (δ, $CDCl_3$) 2.30s ($N(CH_3)_2$), 2.3-3.2m (4H), 4.75s ($Ar-\underline{CH_2}-OH$), 5.88s and 5.93s ($2xO-CH_2-O$), 6.60s (Ar-H), 6.76s (Ar-H), 6.87d and 7.16d, J_{AB} = 16.10 Hz (stilbenic protons), 7.06bs (2Ar-H). UV (EtOH) λ_{max} 305^{sh} and 334 nm (logε 4.17 and 4.33). MS m/e 369 (7.0, M^+), 204 (2.3), 165 (2.0), 148 (3.5), 135 (1.9), 58 (100). Oxidation of the compound 6 by the Jones reagent[4] yielded the amino acid 11[1], m.p. 248-253° (acetone, decomp.), which was isolated in form of a zwitterion. ^{1}H-NMR (δ, $CDCl_3$) 2.84s ($N^+(CH_3)_2$), 2.8-3.2m (4H), 3.06s ($Ar\text{-}CH_2\text{-}CH_2\text{-}Ar$), 5.90s and 5.98s ($2 \times O\text{-}CH_2\text{-}O$), 6.53s (Ar-H), 6.65bs (2Ar-H), 6.75s (Ar-H). UV (EtOH) λ_{max} 234^{sh} and 291 nm ($\log\varepsilon$ 4.02 and 3.87).



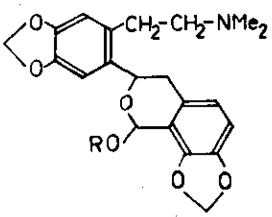
1, R + R = OCH_2O
2, R = OMe



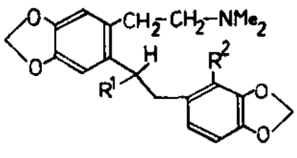
3



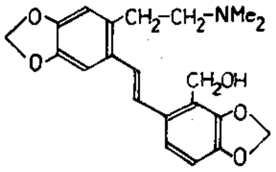
4, R = Me
9, R = H



5, R = Me
7, R = H



6, R^1= H, R^2= CH_2OH
8, R^1= OH, R^2= CH_2OH
11, R^1= H, R^2= COOH



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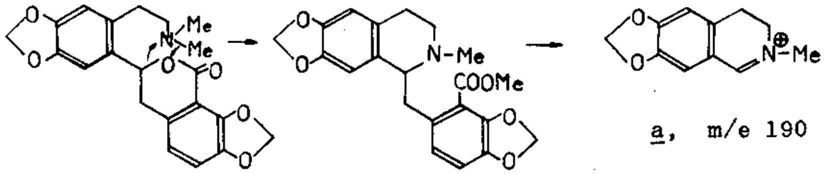

a, m/e 190

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