It is remarkable that the reaction conditions specifically provide an activated ester without affecting the most common protecting groups.

In conclusion we find that the use of phenacyloxy protecting group in peptide synthesis has the advantage that crystalline non-racemized product may be obtained. Considering the mild reaction conditions of the conversion into the activated ester, no racemization may be expected even by using the phenacyloxy intermediates for coupling of fragment peptides.

The present preliminary communication will be followed by a paper with the experimental details and with further investigations on amino acid and peptide derivatives containing the PAO and CPV group.

Zusammenfassung. Es wird über weitere Verwendungsmöglichkeiten der Phenacyloxy-Gruppe in der Peptidsynthese berichtet. Phenacyloxyester reagieren leicht mit Hydrogencyanid unter Bildung der entsprechenden 2-Cyano-2-phenyl-vinyl-ester, welch letztere Derivate sich als gute Acylierungsmittel erwiesen.

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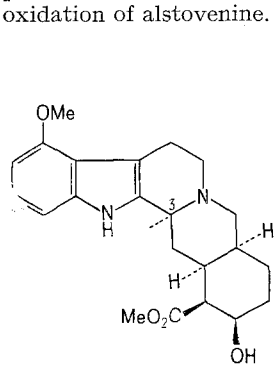
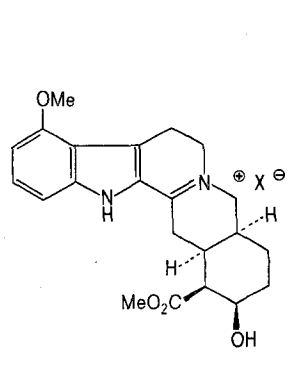
Quaternary Alkaloid of the Bark of *Alstonia venenata* R. Br.

To date, 8 tertiary indole alkaloids[1-4] and an amine oxide, venoxidine[5], have been reported from the bark of *Alstonia venenata* R. Br., a plant which is used in the treatment of insanity and epilepsy in the Indian system of medicine[6]. Search for water-soluble bases in the bark of this plant has resulted in the isolation of a yellow quaternary alkaloid as its chloride, $C_{22}H_{27}N_2O_4Cl$, m.p. 216° (dec.), λ ethanol 207, 252 infl., 256, 348 and 400 nm (log ε, 4.33, 4.19, 4.21, 4.26 and 3.83). The isolation of the alkaloid was achieved by precipitation of the total water-soluble base as Mayer's complex, regeneration of the base chloride by treatment with IRA 400 (Cl^- form) and chromatography over silica gel. The alkaloid as its chloride salt, is slightly hygroscopic in nature but gives fairly stable perchlorate, m.p. 243–244° (dec.) and picrate, m.p. 257–258° (dec.). The UV-spectrum of the alkaloid chloride shows a reversible acid-base shift, λ ethanol/OH^- 230, 297, 308 and 322 nm (log ε, 4.40, 4.29, 4.33 and 4.19), very much like that of 3-dehydroyohimbine, as has been observed by GODTFREDSEN and VANGEDAL[7]. The IR spectral bands at 1635, 1580 and 1552 cm^{-1} of the alkaloid perchlorate are also suggestive of a dihydro-β-carbolinium moiety[8] in the molecule. In conformity with these observations, the alkaloid on reduction with sodium borohydride furnished a tertiary base, $C_{22}H_{28}N_2O_4$, m.p. 170–172°, identical in all respects with alstovenine[1] (I) or isovenenatine[2]. Accordingly, the quaternary base was considered to be Δ^3-alstovenine (II), additional proof of which was secured by direct comparison of the alkaloid perchlorate with the one obtained by mercuric acetate oxidation of alstovenine.



(I)



(II)

The 60 MHz PMR-spectrum of the alkaloid chloride, taken in D_2O, shows a 6 proton methoxy singlet at δ 4.00 (Ar-OMe and COOMe) and 3 aromatic protons spread over a region of δ 6.65–7.65. Unlike alstovenine, which exhibits three vicinal aromatic protons as complex multiplets, these protons appear as three apparent doublets at δ 6.75, 7.15 and 7.53 (J = 8.5 Hz). The simplification of the splitting pattern is presumably due to the electron withdrawing $-C=N^+$ system in conjugation with the indole nucleus which increases the nonequivalency of the protons concerned.

Preparations of the quaternary alkaloid (II), both by oxidation of alstovenine with mercuric acetate[1,2] and venenatine (C-3 epimer of I) with tert. butyl hypochlorite[2], are on record but we have reckoned that such preparation can also be made quite satisfactorily by oxidation of venenatine with hydrogen peroxide in acetic acid. While oxidation of venenatine with hydrogen peroxide in acetic acid under controlled condition is reported to yield venoxidine[5], 3-dehydroalstovenine is the major isolable product if the reaction is carried out at room temperature for 72 h or at waterbath temperature for a short time.

Δ^3-Alstovenine is the second major alkaloid (yield, 0.2%) of the bark of *Alstonia venenata* and is considered responsible for the yellow tint of the latter[9].

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Zusammenfassung. Ein aus der Rinde von *Alstonia venenata* isoliertes quartäres Alkaloid wurde als 3-Dehydroalstovenin identifiziert.

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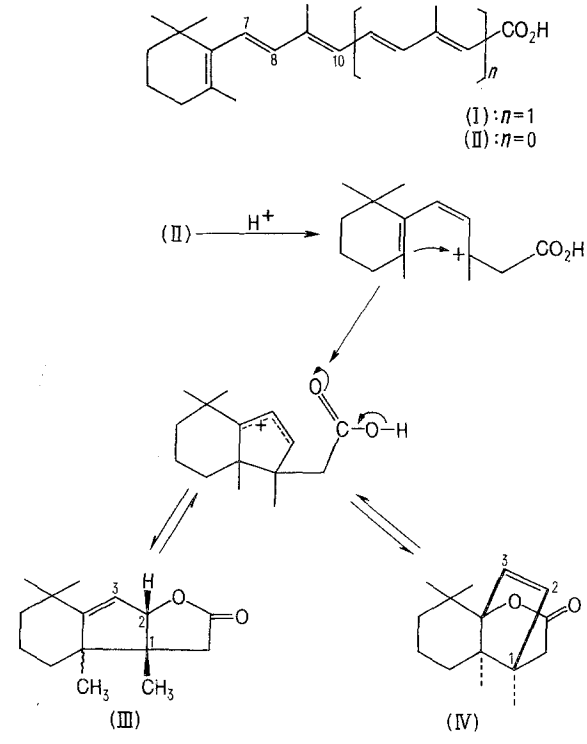
Novel Double-Cyclization Reaction of *Trans*-β-Ionylidene Acetic Acid as a Model for Conjugated Polyenoic Acids

Vitamin A acid (I), one of the important members of the vitamin A family, has been known to produce a highly selective and stable coloration with sulfuric acid, depending upon a concentration of the latter acid[1], though fundamental problems such as clarification of the reaction mechanism and structural elucidation of the key reaction product remain mostly unexplored. This paper deals with a novel, acid-catalyzed double-cyclization of *trans*-β-ionylidene acetic acid (II) as a model project for studying the chemistry of conjugated polyenoic acids, especially of (I)-homologues, toward sulfuric acid.

Treatment of the conjugated trienoic acid (II)[2] in chloroform or in crystals with 70–85% of sulfuric acid at room temperature for a period of a few min, and extraction of the diluted aqueous acidic layer with ether, led to the almost exclusive formation of a reaction mixture consisting of the 2 major components. Successive column chromatographic separation on alumina using ether-petroleum ether (1:4) afforded the compounds A and B. Analysis by glc[3] clearly indicates that a formation ratio of these 2 components is rigorously controlled by the concentration of sulfuric acid employed, e.g. A:B = 6:1 (70% H_2SO_4, (II) in $CHCl_3$), 3:8 (80% H_2SO_4, (II) in $CHCl_3$), and 1:15 (85% H_2SO_4, (II) in crystals). An additional fact for the argument that the compound B would be more stable than the compound A toward higher concentration of sulfuric acid, was also obtained from their interconversion experiments starting from each compound A or B, viz., 88% of A was converted into B in 85% sulfuric acid solution, while in marked contrast, only 4% of B into A. It should also be pointed out that the coloration of (II) in sulfuric acid can also be regenerated from the compounds A or B with a proper concentration of sulfuric acid.

The structures (III) and (IV) have been determined for the compounds A and B, respectively, on the basis of the following spectral data and on the examination of DREIDING stereomodels.

Compound A. $C_{15}H_{22}O_2$[3]; m.p., 62–3°; R_t 8.1 min[3]; UV, end absorption only; IR, 1780 (saturated γ-lactone), 1626 (C = C), 1168 and 998 cm^{-1}; NMR δ ppm, 1.14 (*s*, 12H, 4 saturated CH_3), 1.4–1.6 (6H,3 saturated CH_2), 1.83 and 2.46 (AB *q*, 2H,J = 16.0 Hz, C–1–CH_2COO-; one of the protons indicates the long-range coupling with the C–1–CH_3), 4.87 (*d*,1H,J = 1.2 Hz[4], C–2–H), 5.38 (*d*,1H,J = 1.2 Hz, C–3–H), and no indication of any vinyl CH_3; MS *m/e*, 234.16127 (M^+), 219 (M–15) and 178 (M–56, base).



Compound B. $C_{15}H_{22}O_2$; subl. at 190°; R_t 11.4 min; UV, end absorption only; IR, 1728 (saturated δ-lactone), 1256 and 1080 cm^{-1}; NMR δ ppm, 0.94, 1.00, 1.13 and 1.34 (*s* and 3H each, 4 saturated CH_3), 1.2–1.9 (6H, 3 saturated CH_2), 2.01 and 2.43 (AB *q*, 2H, J = 18.0 Hz, C–1–CH_2COO–), 5.06 and 5.57 (AB *q*, 2H, J = 9.8 Hz, C–2– and C–3–H), and no indication of any vinyl CH_3; MS *m/e*, 234.16197 (M^+), 219 (M-15) and 178 (M-56, base).

Because of the diffusion of the olefinic proton signal into a general background, direct NMR-evidence on the formation of an intermediate cyclomonoenylic cation[5] in sulfuric acid was not obtained unequivocally under ordinary running conditions. However, all experimental data can be accounted for most reasonably through a mechanism shown in the Scheme, viz., an initial protonation to this system is believed to occur at the C-10 position, followed by an isomerization and double-

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[3] UV were taken in EtOH, and IR and NMR in CCl_4 solutions. New compounds described gave satisfactory high resolution mass spectral analysis. Glc: 1.5% OV-17, column 0.4 × 100 cm, injector 180°, column 150°, detector 220°, N_2 60 ml/min; glpc: 1.5% OV-17, 0.25″ × 5′, 210°, 190°, 250°, He 60 ml/min.

[4] Compatible with the preferable *cis*-ring fusion between the two 5-membered rings.

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