rather difficult to obtain suitable crystals of the β form for single crystal work and its space group has not yet been established.

The solution of the structures will be pursued.

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Preliminary Note on the Configuration at C_{22} of *Solanum* Alkaloids

PER M. BOLL

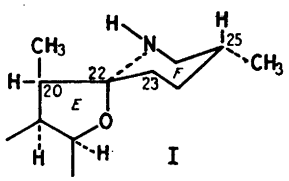
Royal Danish School of Pharmacy, Chemical Laboratory B, Copenhagen, Denmark

Tomatidine and 5α-solasodanol-(3β) are generally believed to represent two types of *Solanum* alkaloids (aminoketal alkaloids) related to each other in the same manner as the "neo" and "iso" steroid sapogenins, *i. e.* they differ in configuration at C_{25} by having an axial C_{25}-methyl group (structure II) and an equatorial C_{25}-methyl group (structure I), respectively.

Recently, Schreiber [1] and later Toldy [2] have suggested, however, that the two compounds differ in configuration at C_{22}. According to their formulation, tomatidine is a 22β-compound (structure III) and 5α-solasodanol-(3β) a 22α-compound (structure I). This difference in configuration at C_{22} will cause the methyl groups at C_{25} in both compounds to be equatorial.

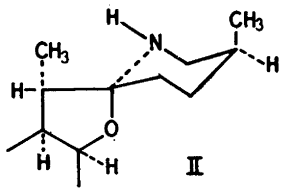
The work submitted in this preliminary note supports the idea that tomatidine and 5α-solasodanol-(3β) in fact differ in configuration at C_{22}. It was found that tomatidine forms an N-bromo as well as an N-chloro derivative, whereas 5α-solasodanol-(3β) only forms an N-chloro derivative.

With the object of estimating the space requirements for binding a halogen atom to the nitrogen atom of ring F the hydrogen:halogen separation distances were measured on Dreiding molecular models. These measurements indicate that the distance between the N-halogen atom and two of the hydrogen atoms of the C_{20}-methyl group in structure I is 2.4 Å. In



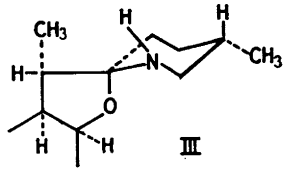
I

22α-iso



II

22α-neo



III

22β-iso

structure III the distance between the N-halogen and the hydrogen atom at C_{20} is 2.6 Å.

Assigning a van der Waals radius of 1.0 Å to hydrogen and radii of chlorine and bromine of 1.8 Å and 1.95 Å, respectively, the distances H ⟷ Cl and H ⟷ Br can be estimated to 2.8 Å and 2.95 Å, respectively. Although the measured distances H ⟷ Hlg in structure I and III only are 2.4 Å and 2.6 Å, respectively, one can easily see, remembering the experimental facts, that the difference in the measured distances is of an order of magnitude allowing the formation of an N-chloro derivative, but not the formation of an N-bromo derivative in the case of 5α-solasodanol-(3β). Furthermore, small distortions of the bond angles in rings E and F may increase the H ⟷ Hlg separation distances to values estimated using the van der Waals radii. Such distortions of bond angles are quite common [3].

Table 1. Halogen derivatives of *Solanum* alkaloids.

Derivative	Halogen content * Calc.	Found	M. p., °C **	$[\alpha]_D^{24}$ ($CHCl_3$)
N-Chlorosolasodine	7.92	7.89	153	−114°
N-Chloro-5α-solasodanol-(3β)	7.89	7.97	183	− 59°
N-Chlorotomatidine	7.89	8.06	175	+ 35°
N-Bromotomatidine	16.17	16.18	208 ***	+ 51 ***

* The halogen content determined by iodometric titration.

** The m. p. reported are corrected. All four compounds melt under decomposition.

*** Toldy reports the m. p. 202–205°C and $[\alpha]_D^{20}$ −8.6 (dimethylformamide). However, N-bromotomatidine is quite unstable and decomposes to tomatidine hydrobromide ($[\alpha]_D^{24}$ −8.0 (CH_3OH)).

Fieser and Fieser [4] have suggested that 22β-steroid sapogenins are destabilized by steric interference between the two hydrogens at C_{22} and the hydrogens of the C_{20}-methyl group, these being only 1.8 Å apart. However, similar model considerations by the present author on a 22β-steroid sapogenin and a 22β-aminoketal alkaloid indicate that the above mentioned hydrogens are in fact 2.0 Å apart. This last distance is a permissable hydrogen:hydrogen separation distance.

Further details of this work will be submitted shortly.

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