

Technical Note

The Identification of 1-Dehydromethandrostenolone

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ABSTRACT: A recent steroid seizure was identified as 1-dehydromethandrostenolone, a positional isomer of methyltestosterone. GC/MS results are reported.

KEYWORDS: 1-Dehydromethandrostenolone, 1,(5 α)-Androsten-17 α -methyl-17 β -ol-3-one, Anabolic Steroid, GC/MS, Forensic Chemistry

Introduction

The Naval Criminal Investigative Service (NCIS) Regional Forensic Laboratory (San Diego, California) recently received 22 white capsules containing a dark granular material, a suspected steroid (see Photo 1). The exhibits were seized in San Diego by NCIS personnel from a member of the U.S. military who was believed to be a member of a steroid trafficking group (details not available). Analysis of a methanolic extract by GC/MS indicated a mixture of niacinamide and an unknown steroid with the same molecular weight as methyltestosterone (302), but with a different retention time and fragmentation pattern. Library searches on the unknown spectrum were inconclusive.



Photo 1

Experimental

1-Dehydromethandrostenolone standard was acquired from Steraloids (Code A4450-000; www.steraloids.com/pages/page028.html). GC/MS data were acquired using an HP 6890 GC interfaced with a HP 5972A MSD. The GC was equipped with a 30 m x 250 μ m x 25.0 μ m J&W DB-5MS capillary column, with an initial temperature of 70 $^{\circ}$ C (2 minutes), then a ramp of 20 $^{\circ}$ C/minute up to 300 $^{\circ}$ C, then held for 15 minutes.

Results and Discussion

Figure 1a shows the Total Ion Chromatogram resulting from analysis of the methanolic extract. The first peak was identified as niacinamide (Figure 1b). The second peak (Figure 2a) was apparently isomeric with methyltestosterone (Figure 2b). After consultation with DEA laboratory personnel, the second peak was tentatively identified as 1-dehydromethandrostenolone (1,(5 α)-androsten-17 α -methyl-17 β -ol-3-one). Analysis of a commercial standard confirmed 1-dehydromethandrostenolone (Figure 2c; Note that the variations in relative mass fragment abundances between Figures 2a and 2c are due to acquisition on different mass spectrometers).

1-Dehydromethandrostenolone is controlled under Schedule III of the U.S. Controlled Substances Act. It is a positional isomer of methyltestosterone, with the only difference being the location of the double bond within the steroid "A" ring (see Figure 3). In 1-dehydromethandrostenolone the double bond is between the 1 and 2 carbons, whereas in methyltestosterone it is between the 4 and 5 carbons. Both 1-dehydromethandrostenolone and methyltestosterone are classified as anabolic steroids.

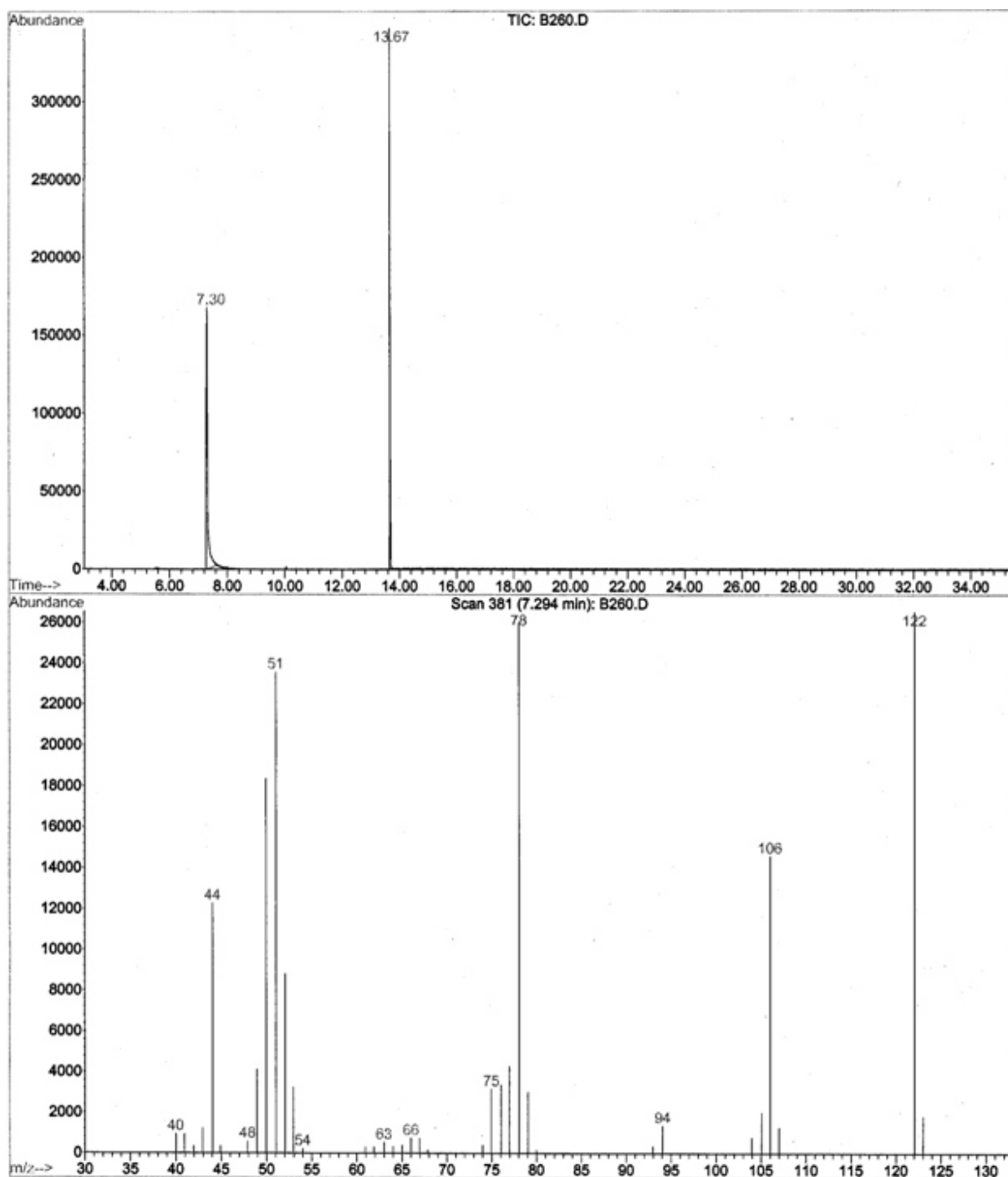


Figure 1. (a) Total Ion Chromatogram; (b) Mass Spectrum of Niacinamide (7.3 Minutes).

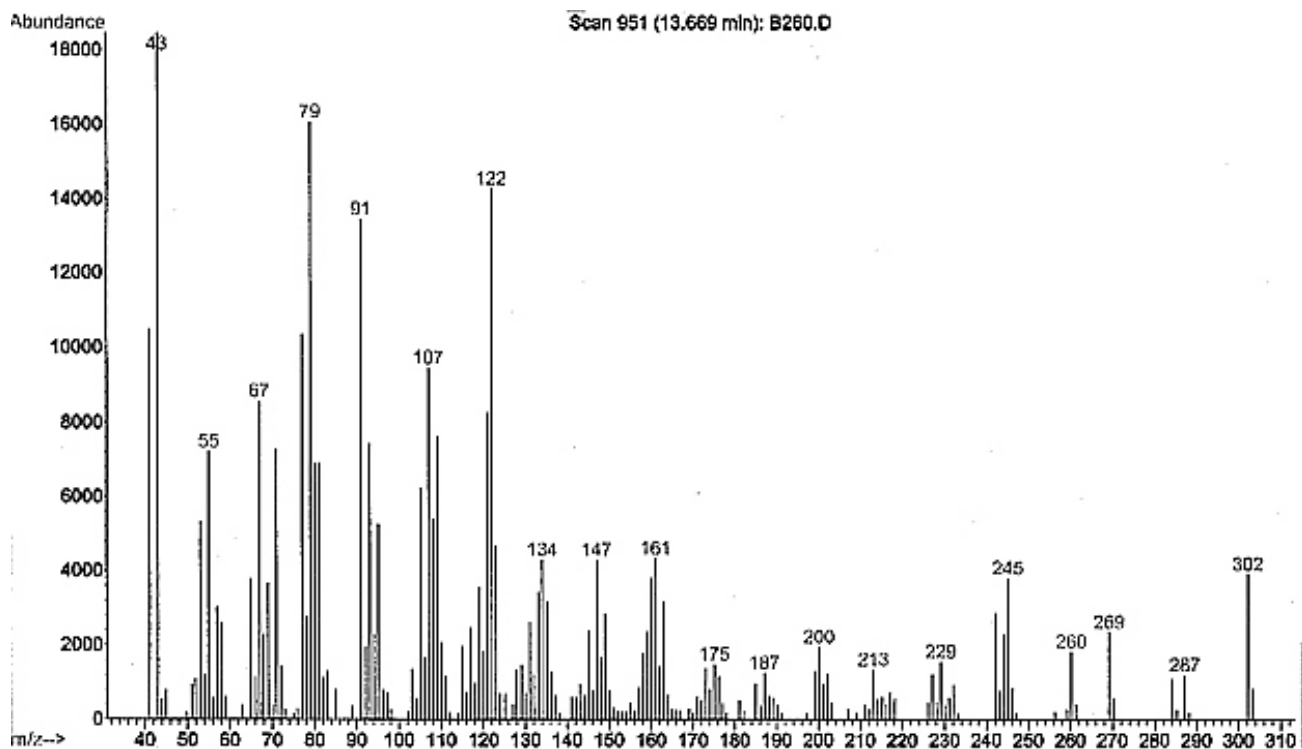


Figure 2a. Mass Spectrum of Unknown Steroid (13.67 Minutes in Figure 1a).

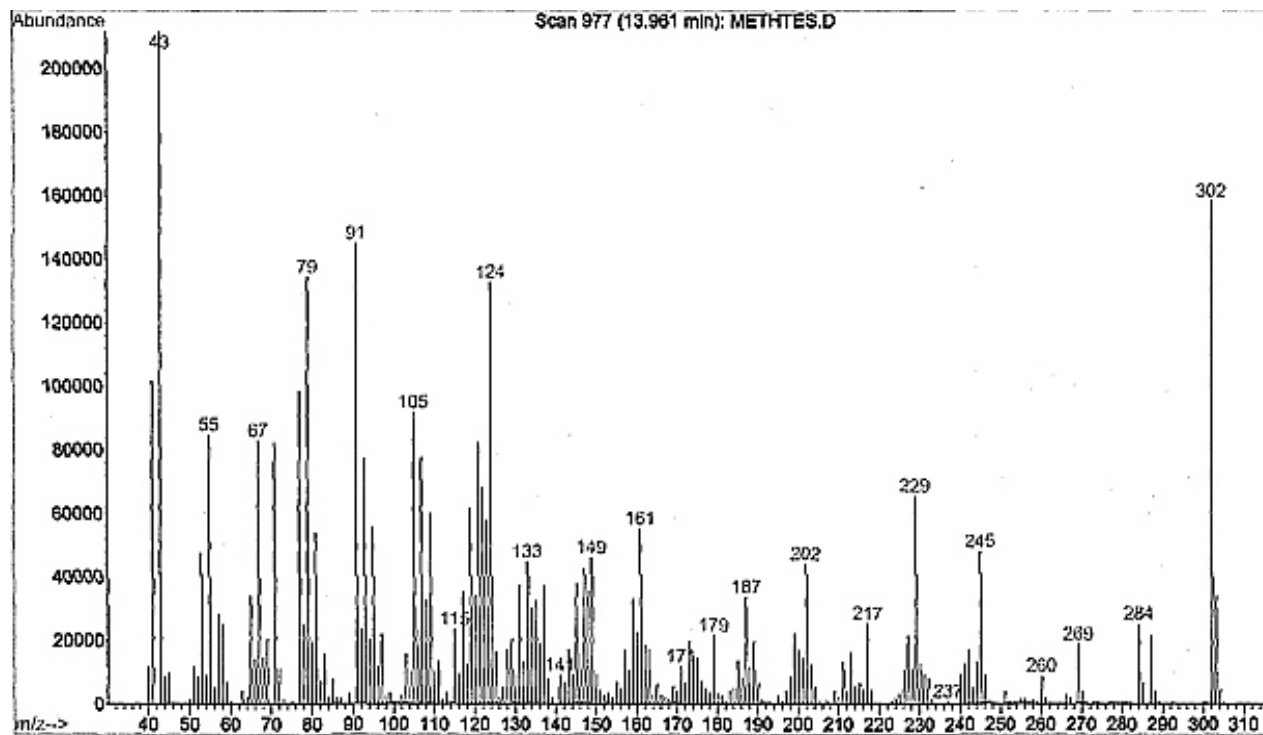


Figure 2b. Mass Spectrum of Methyltestosterone Standard. Contrast the Peaks at m/z 107 and 122 in Figure 2a Versus the Peaks at m/z 105 and 124 in this Spectrum.

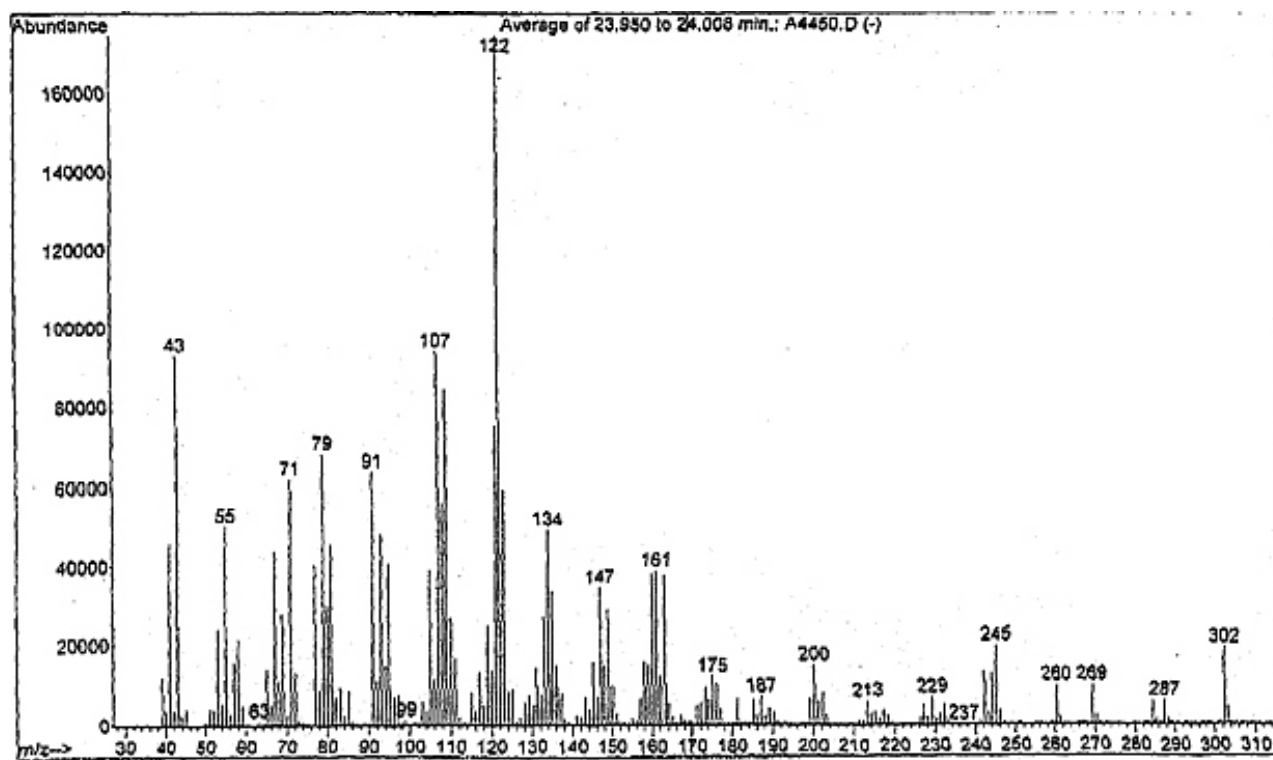
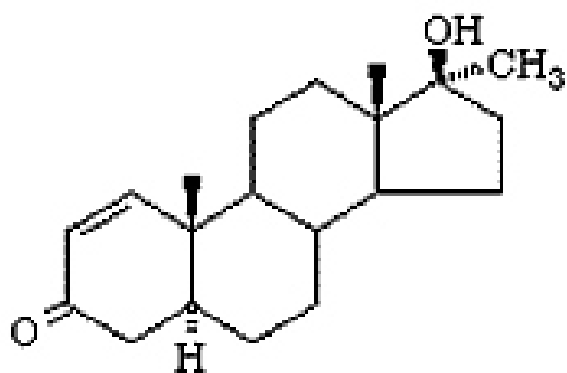
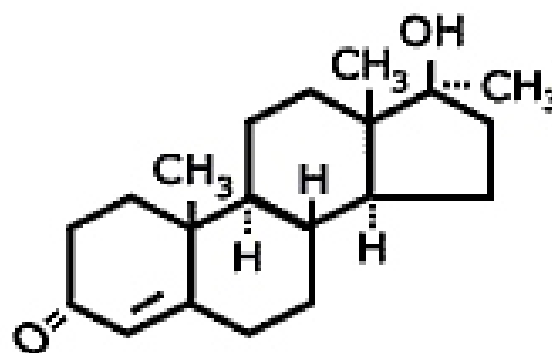


Figure 2c. Mass Spectrum of 1-Dehydromethandrostenolone Standard.



1-Dehydromethandrostenolone



Methyltestosterone

Figure 3. Structural Formulae

¹ - The NCIS San Diego Laboratory ceased operations in early 2006.