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PREPARATION OF 9, DESOXO-9, DEHYDRO METHYL PHEOPHORBIDE a.

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The reaction of 9, desoxo-9, hydroxy substituted methyl pheophorbide a with triflouro acetyl imidazole and 1-8, bis-dimethyl amino naphthalene yielded 9, desoxo-9, dehydro methyl pheophorbide a.

Key words: Pheophorbide, Pheophorbide a; Pyropheophorbide.

INTRODUCTION

Photo reduction of pheophorbide was performed by Shul'ga *et. al.,* [1] to get two products at 520-30 and with zinc forming zinc complexas. Conversion by photochemical dehydrogenation of natural transpheophorbide was accomplished by Wolf *et. al.* [2] with ascorbic acid in ethanol in the presence of 1,4 diazobicyclo 2,2,2. octane with white light in a two-step process via an unstable intermediate which in a dark reaction gave *cis*-pheophorbide. Sievers [3] and his co-workers have reported the separation and identification of pheophorbide a and b, as well as the saponifiable products of pheophorbide a and b by thin layer chromatography on commercial cellulose layers on microscale using two solvents systems i.e. light petroleum (b.p. 60-80*c*), pyridine (9:1) and heptane-pyridine (7:3).

Pheophorbide a after methylation was reduced with sodium borohydride to produce 9, desoxo-9, hydroxy methyl pheophorbide a which was subsequently dehydrated at C-9 with axcess of triflouro acetyl imidazole followed by addition of 1,8-*bis* dimethyl amino naphthalene using pyridine-ethanol mixture as a solvent to afford 9, desoxo-9, dehydro methyl pheophorbide a, analysed for $C_{36}H_{38}O_4N_4$, MS:590 (M^+), the other main fragments were at m/e 532, 446 and 421 due to expected loss of moieties from $COOCH_3 + CH_2CH_2COOCH_3 + C = CH_3$

In Table 1, the olefinic proton at C-9 shows chemical shift at 5.41 ppm; the results are compared with 9, desoxo-9, hydroxy methyl pheophorbide a prepared by H. – Wolf *et. al.* [4].

EXPERIMENTAL

Microanalysis of the compound was undertaken on Perkin Elmer Automatic Analyser. The I.R. spectra were recorded on Perkin Elmer double beam grating spectro photo-meter in KBr pellets. Nuclear magnetic resonance spectra were recorded on Bruker WP – 80 (80 MHZ) spectro photometer using TMS, as internal standard. The mass spectra were taken on ZAB – 2F vacum generator, Manchester.

Esterification of the mixture of pheophorbide a and b was accomplished with methanol-sulphuric acid and the methyl esters separated by T.L.C. to afford 9, desoxo-9,

Table 1. δ = ppm.

Proton no.	9, desoxo-9, hydroxy.6. methyl pheo-.7. 9, desoxo-9, dehydro methyl pheophorbide a. phorbide a. methyl pheophorbide a.			
	I	II		
β-H	9.86 ppm	9.84 ppm	9.49 ppm	8.54 ppm
α-H	9.66 =	9.63 =	9.35 =	8.36 =
δ-H	8.93 =	8.91 =	8.54 =	7.60 =
2a-H	a 8.20 =	8.18 =	7.98 =	7.54 =
2a-H	b 6.32 =	6.33 =	6.26 =	6.49 =
	c 6.15 =	1.16 =	-----	-----
10-H	6.34 =	5.92 =	6.17 =	6.06-5.92 =
9-H	β 6.71 =	α 6.63 =	-----	5.41 =
7-H	4.61 =	(4.55) =	4.43 =	4.30 =
8-H	4.41 =	(4.62) =	4.16 =	4.08 =
10b-CH_3	3.86 =	3.82 =	3.81 =	3.91 =
5-CH_3	(3.61) =	3.59 =	3.64 =	3.67 =
4a-H	3.83 =	3.79 =	3.60 =	3.28 =
7-$COOCH_3$	(3.50) =	3.13 =	-----	2.98 =
1-CH_3	3.53 =	3.53 =	3.35 =	2.92 =
3-CH_3	3.38 =	3.36 =	3.16 =	2.86 =
7b-H			2.54 =	
	2.0-2.8 =	2.0-2.6 =		2.0-2.6 =
7a-H			2.27 =	
8a-H	1.85 =	1.88 =	1.74 =	1.61 =
4b-H	1.74 =	1.72 =	1.62 =	1.48 =

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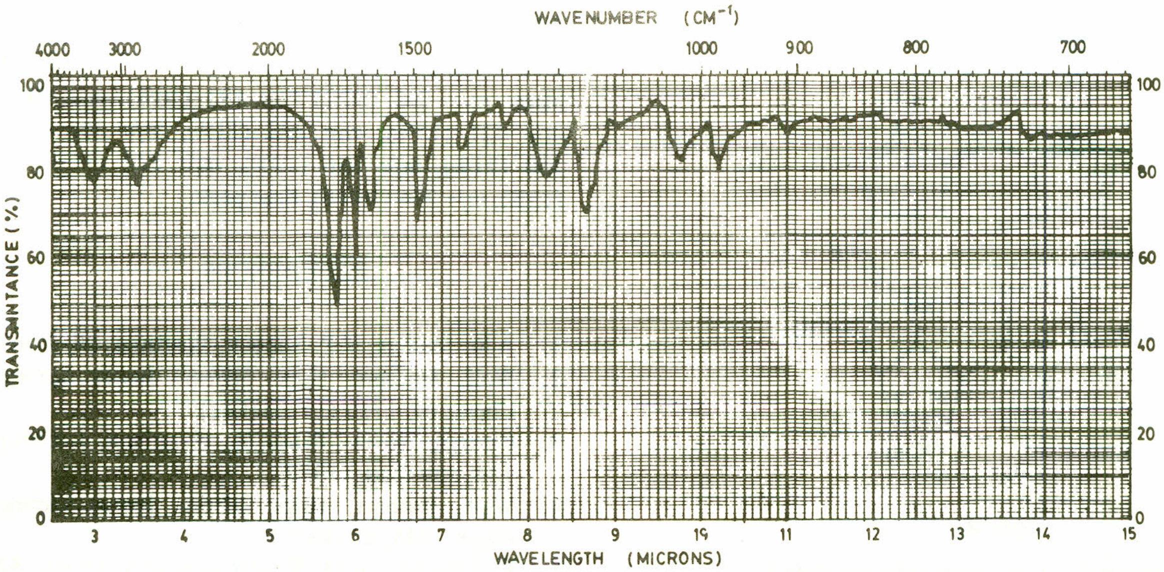


Fig. 1

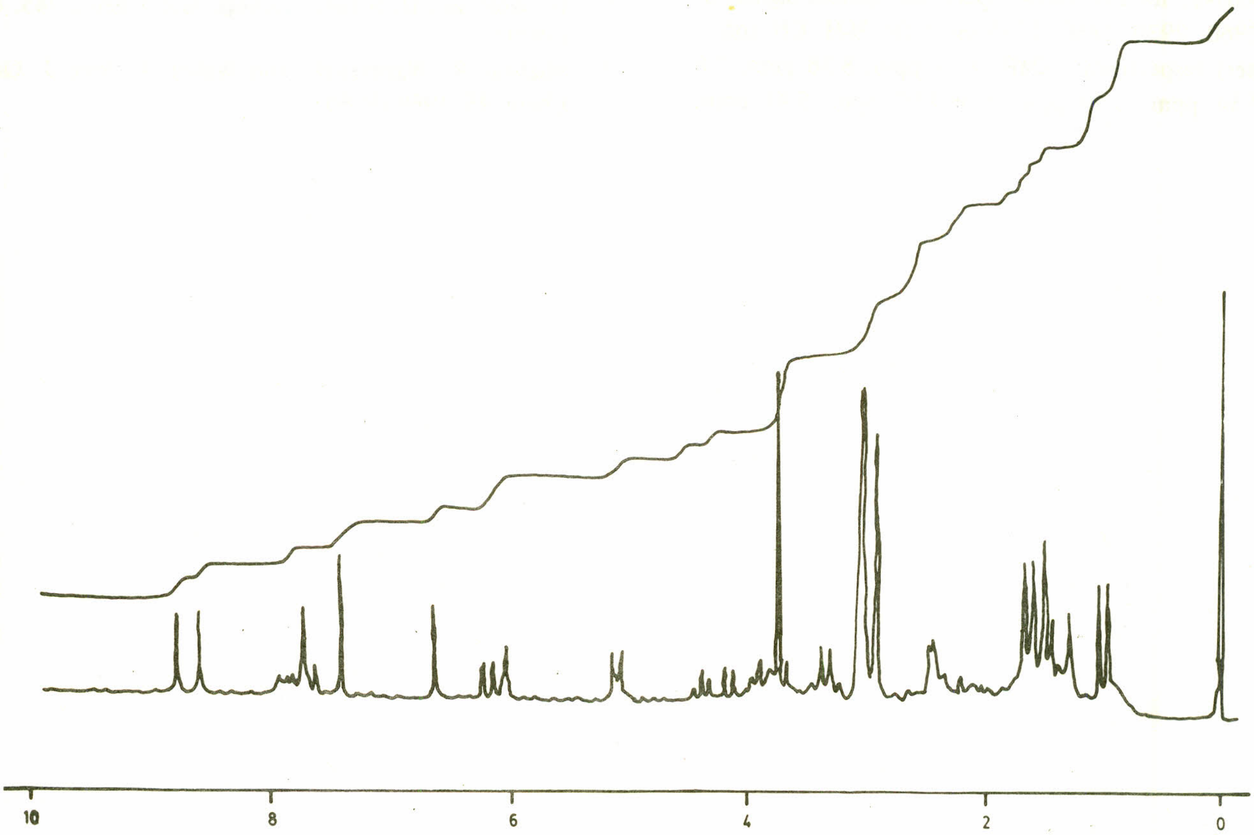
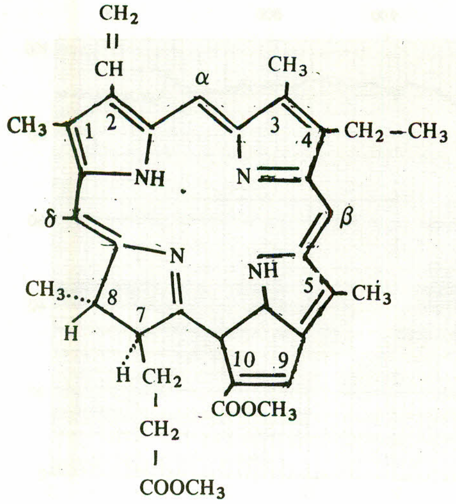


Fig. 2

methyl pheophorbide a and b, [5] which on reduction with sodium borohydride in pyridine-methanol, gave 9, desoxo-9, hydroxy methyl pheophorbide a. [6].

Dehydration of 9, desoxo-9, hydroxy methyl pheophorbide a. 9, desoxo-9, hydroxy methyl pheophorbide a (120 mg) in a mixture of pyridine (1.4 g) and ethyl alcohol 1.5 mole (6.25 ml) was treated with axcess of triflouro acetyl imidazole (1 ml) over five minutes at 0°, followed by addition of 1-8, *bis* dimethyl amino naphthalene (120 mg, 3 moles) and stirred for 30 min. at 0° and then for 3 hr. at 25°. The reaction mixture worked up in the usual manner by T.L.C (CH_2Cl_2:Me_2CO) 9, desoxo-9, dehydro methyl pheophorbide yielded (52%) recrystallised form methylene chloride acetone m.p. 97-8°, analysed for



9, desoxo-9, dehydro methyl pheophorbide A'

$C_{36}H_{38}O_4N_4$. Its I.R. (KBr) spectrum showed signals at 3400, 2960, 2930, 2850, 1735 cm-1 for N-H, CH and – CO (ester) respectively, NMR: 8.54 ppm, 8.36 ppm, 7.6 ppm, 7.54 ppm, 6.49 ppm, 6.06-5.92 ppm, 5.41 ppm, 4.30 ppm, 4.08 ppm, 3.91 ppm, 3.67 ppm, 3.28 ppm, 2.98 ppm, 2.86 ppm, 2.0-2.6 ppm, 1.61 ppm, 1.48 ppm, Mass: *m/e* 590 (60%) *m/e* 532 (20%), *m/e* 446 (19%), *m/e* 421 (15%), *m/e* 393 (11%), *m/e* 366 (13%), *m/e* 350 (21%), *m/e* 336 (13%), *m/e* 322 (14%), *m/e* 308 (13%), *m/e* 294 (100%), Base peak.

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