

TABLE I
Mean square amplitude matrices in A^2 for $PtCl_4$

Σ_{11}	Σ_{22}	Σ_{33}	Σ_{44}	Σ_{45}	Σ_{55}
0.002147 0.001435	0.002542 0.001584	0.00770 0.002937	0.02072 0.012139	0.000365 0.006301	0.018736 0.0066483

worthy that the quadratic equation given above does not require the knowledge of isotopic frequencies.

We give in Tables I, II and III unique sets of different molecular constants for $PtCl_4$.

TABLE II
Force constants in m dynes/ \AA for $PtCl_4$

F_{11}	..	2.3116
F_{22}	..	1.9035
F_{33}	..	6.5540
F_{44}	..	3.141
F_{45}	..	-0.01915
F_{55}	..	0.6389

TABLE III
Potential energy distribution for various species of $PtCl_4$

A_{1g}	..	1.000
B_{1g}	..	0.9120
B_{2g}	..	0.0007
E_u	..	2.02 -0.0069977
		0 2.061

They differ considerably from those reported by previous workers⁵. The molecular constants obtained in this paper give a better physical picture since they do not invoke any force field model and are based purely on experimental values. The details of the calculations and general formulae derived will be published shortly.

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MAGNETIC SUSCEPTIBILITY OF SOME NEW PALLADIUM COMPLEXES

MAGNETIC susceptibility of four new palladium complexes, dichloro-, dibromo-bis (diphenyl ethyl arsine) Palladium II and dichloro-, dibromo-bis (diphenyl propyl arsine) Palladium II, have been measured at room temperature by the Gouy method^{1,2}. A semi-microbalance (Mettler) with a sensitivity of $\pm 2 \times 10^{-5}$ gm was used for the measurement of force on the specimen and an electromagnet, fed by a series of batteries, provided steady magnetic fields upto 5,000 oersteds.

The complexes studied were newly synthesised by G. K. N. Reddy and co-workers (Department of Chemistry, Bangalore University) and were in fine powder form.

The values of susceptibilities of the complexes were all measured relative to that of benzene at room temperature, following the method of Mulay³. The equation (Ref. 3) employed in the computation of the susceptibility values by this method requires the knowledge of the density of the substance under investigation. Hence, the densities of the complexes were determined by the method of Reilly and Rae⁴ and by using methoxy-ethanol as the standard liquid in which these complexes are insoluble. The value of densities thus obtained (see Table I) were used in the computations.

Measurements of susceptibility of each complex were made in four different runs at intervals of a few days and the reproducibility of results was found to be satisfactory with an estimated accuracy of about 3%. The mean values of magnetic susceptibilities and densities obtained for the complexes are given in Table I. All the four complexes are found to be diamagnetic.

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TABLE I

Values of densities and magnetic susceptibilities of the palladium complexes at room temperature

No.	Name of the complex	Chemical formula	Density (gm cm ⁻³)	Mass susceptibility (C.G.S. unit)
1	Dichloro- <i>bis</i> (diphenyl ethyl arsine) Palladium II	PdCl ₂ (Ph ₂ EtAs) ₂	1.67	-0.32 × 10 ⁻⁶
2	Dibromo- <i>bis</i> (diphenyl ethyl arsine) Palladium II	PdBr ₂ (Ph ₂ EtAs) ₂	1.87	-0.48 × 10 ⁻⁶
3	Dichloro- <i>bis</i> (diphenyl propyl arsine) Palladium II	PdCl ₂ (Ph ₂ PrAs) ₂	2.08	-0.35 × 10 ⁻⁶
4	Dibromo- <i>bis</i> (diphenyl propyl arsine) Palladium II	PdBr ₂ (Ph ₂ PrAs) ₂	2.24	-0.50 × 10 ⁻⁶

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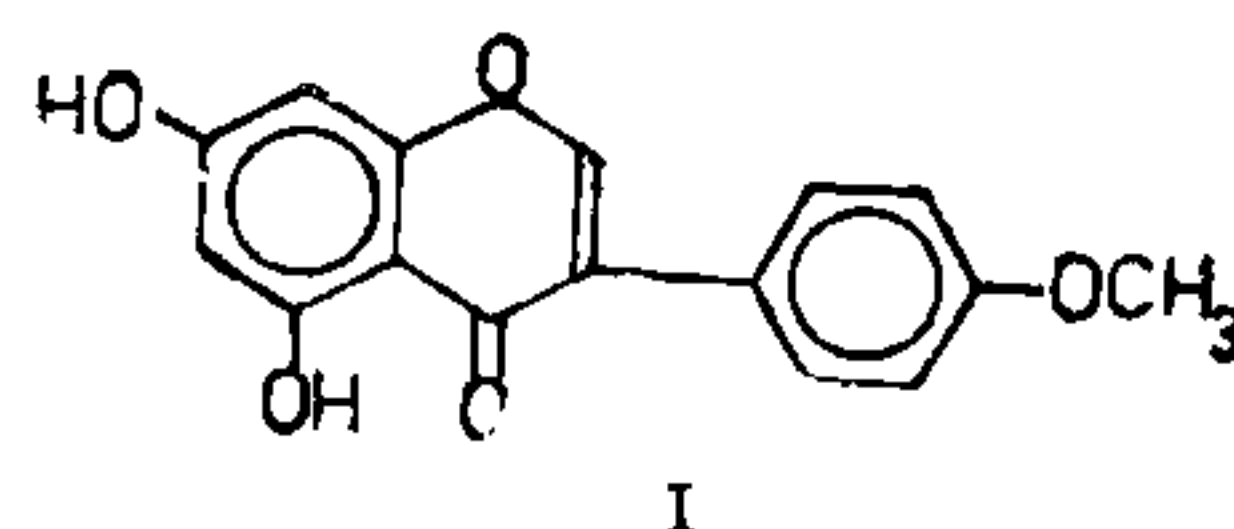
ISOLATION OF BIOCHANIN-A FROM THE HEARTWOOD OF *SOPHORA MOLLIS*

Sophora mollis (Leguminosae) is an indigenous plant grown in temperate regions. Its seeds are considered to be useful to destroy vermin¹. The heartwood obtained from Kashmir has been examined and is found to contain biochanin-A among other components.

The powdered heartwood (1 kg) was exhaustively extracted with hot benzene and the benzene solution evaporated to dryness to afford a residue (3.20 g). TLC* showed it to be a mixture and therefore it was purified by column chromatography using silica gel as adsorbent. The major component (2.80 g) eluted with benzene, crystallized from methanol as colourless plates, m.p. 210–11° C; *R_f* 0.59. It showed brownish-violet ferric reaction, dissolved in aqueous sodium carbonate, formed an acetate which crystallized from methanol as white needles, m.p. 190° C; *R_f* 0.65 and methyl ether which crystallised from methanol as colourless prisms, m.p. 160–61° C; *R_f* 0.25.

A comparison of NMR spectra of the acetate (3s at δ 2.36, 2.44 and 3.90 ppm) and methyl ether (3s at δ 3.83, 3.88 and 3.95 ppm) indicated that the parent compound has one -OCH₃ group and two -OH groups, of which one is chelated as shown by ferric reaction,

Further there are seven more protons in the downfield region out of which two are meta-coupled aromatic protons (2d at δ 6.38, 6.45 in methyl ether and 6.98, 7.02 ppm in acetate, *J* = 2 Hz). The UV spectra of the parent compound ($\lambda_{\text{max}}^{\text{EtOH}}$ 262 nm, strong and broad) and its acetate ($\lambda_{\text{max}}^{\text{EtOH}}$ 255 nm, strong and broad) indicated an isoflavone structure. A further study of the NMR spectra showed 2-H of isoflavone (1s at δ 7.77 in methyl ether and 8.01 ppm in acetate) in the most downfield region. Similarly, 4'-oxygenation was suggested by two doublets in the aromatic region (δ 6.93, 7.51 in methyl ether and 7.27, 7.58 in acetate, *J* = 8.5 Hz). Hence the parent compound could be 5,7,4'-trioxygenated isoflavone or some monomethyl ether of genistein. In fact elemental analysis (Found: C, 67.6; H, 4.5%) agreed with the expected molecular formula (Calculated for C₁₆H₁₂O₅: C, 67.6; H, 4.2%); the complete methyl ether agreed with genistein trimethyl ether² and the parent compound with biochanin-A in m.p. of this itself and its acetate³. Identity of the natural compound with biochanin-A was further established by hydrolysis with 50% aqueous alcoholic potash to 2,4,6-trihydroxyphenyl-4-methoxybenzyl ketone, m.p., 194–5° C⁴ and by direct comparison with an authentic sample of biochanin-A†(I) (undepressed m.m.p., identical TLC, superimposable IR spectra).



The present isolation of biochanin-A in considerable amounts is significant because it has oestrogenic properties⁵. It is earlier reported to occur in a number of other Leguminosae plants⁶ such as *Cicer arietinum* L.