calculated regression line[4] may be expressed by the equation

$$P = 5 \cdot 196\ V - 4 \cdot 811.$$

where

P = gm of protein per 100 ml
V = relative viscosity.
the standard error of estimate of P = 0·29 gm/100 ml.

This equation could be used to determine the protein concentration in pleural and ascitic fluids. Recovery experiments using bovine albumin gave results within an error of 0·34 g/100 ml of the fluid.

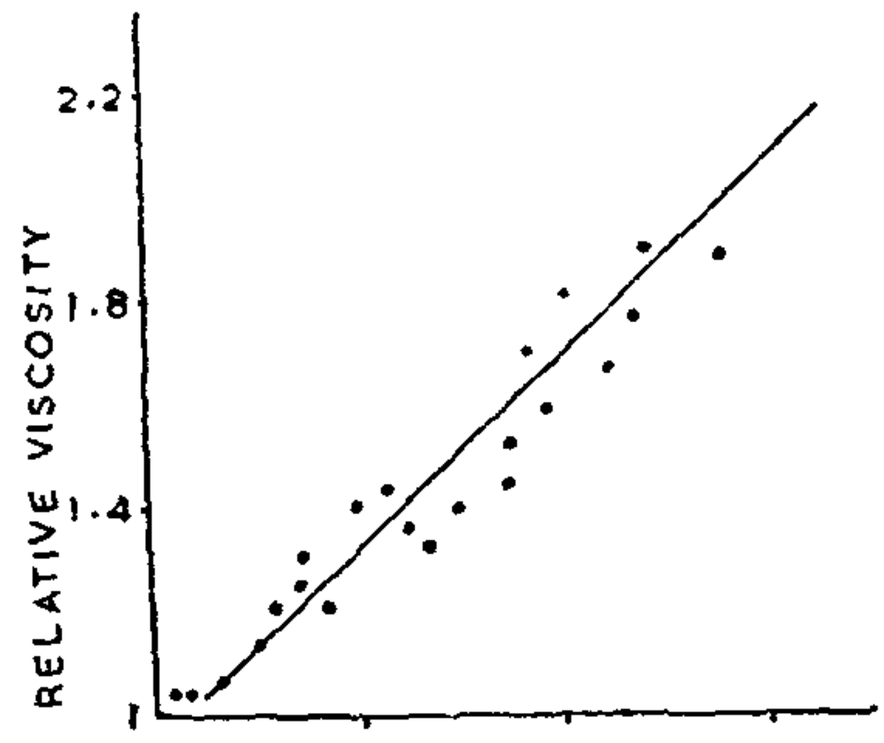

FIG. 1. Relative viscosity values plotted against fluid protein. The equation for the statistically calculated regression line is $P = 5 \cdot 196\ V - 4 \cdot 811$.

The calculated regression equation for the relative viscosity may be expressed as

$$V = 0 \cdot 109\ P + 1 \cdot 083$$

standard error of estimate of V = 0·04.

It is known that if a fluid is a transudate the protein level will be less than about 2 gm/100 ml[5]. For a sample with a protein concentration of 2 gm/100 ml the relative viscosity calculated on the basis of the above equation is $1 \cdot 3 \pm 0 \cdot 04$. Hence, the relative viscosity of $1 \cdot 3 \pm 0 \cdot 04$ may be taken as a border for transudate and exudate. Any sample having higher relative viscosity may be considered an exudate resulting from inflammation.

The viscosity method provides a rapid determination of protein concentration in pleural and ascitic fluids and assists in classifying them as transudate or exudate. This is required to know whether there is inflammation or not and to treat the patient accordingly. As this method requires neither chemicals nor electricity it could be used in mobile hospital units to advantage.

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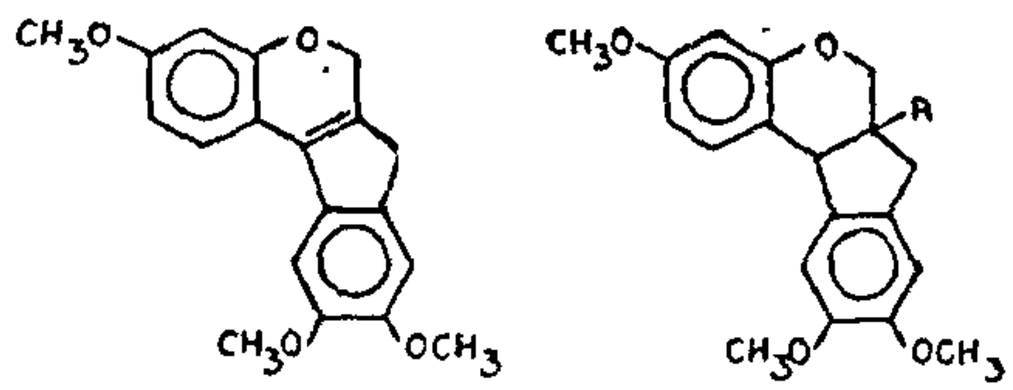
A SYNTHESIS OF (±) O-TRIMETHYL-BRAZILIN AND (±) O-TETRAMETHYL-BRAZILIN

EARLIER attempts towards the synthesis of brazilin were contemplated by way of anhydro-O-trimethyl-brazilin (I) by addition of elements of water to the double bond. Thus although two groups of workers[1,2] were able to synthesise (I) almost simultaneously, all attempts to add elements of water proved abortive. This is because (I) in itself is the *leuco*-base of quinonoid oxonium salts and so passes into them with great ease in presence of acids. Even dry hydrogen chloride in cold chloroform converts (I) into trimethoxybrazilium chloride[1].



I

II, R = H
III, R = OH
IV, R = OCH_3

It occurred to us that hydroboration of the double bond in (I) should be feasible on general grounds and indeed when (I) was hydroborated in ether ($AlCl_3 + NaBH_4$) and the product worked up, an excellent yield of *cis* O-trimethylbrazilane (II), m.p. 109–10°, was obtained. When (I) was hydroborated in tetrahydrofuran and the resulting

organo-borane oxidised by alkaline hydrogen peroxide, a complex mixture was obtained which on chromatography over alumina gave (±) O-trimethylbrazilin (III), m.p. 135–36° (acetate, m.p. 185–86°), an unidentified product, m.p. 285° and a considerable amount of a gummy product which was not examined further. The synthetic product was identical with an authentic sample obtained through the courtsey of Professor O. Dann[3,4]. This synthesis is stereo-specific and proves that the ring junction of the chroman ring and the indane ring is *cis* in brazilin. When (III) was methylated by methyl iodide in presence of potassium hydroxide under carefully controlled condition (±) O-tetramethylbrazilin (IV), *m.p.* 113–14°, was obtained having superimposable i.r. spectrum in chloroform solution with natural (+) O-tetramethylbrazilin, m.p. 139–40°. It may be pointed out that this racemic compound is claimed to have been synthesised by Chakravarty[5] who reported an m.p. 133–35° but there is little doubt Chakravarty's product must have a different structure.

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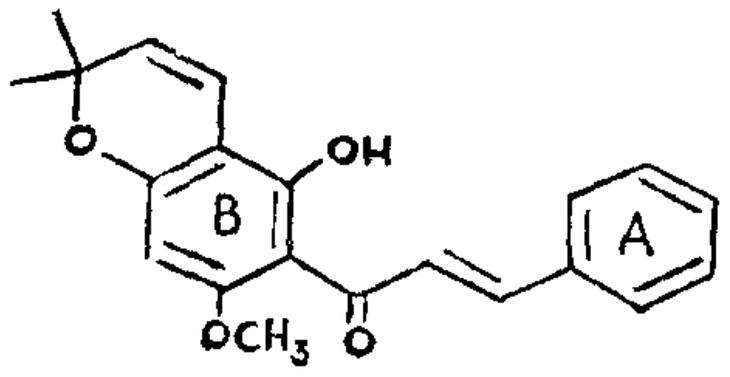
ISOLATION OF PONGACHALCONE-I FROM THE HEART-WOOD OF *PONGAMIA GLABRA* L. MERR.

THE heart-wood of *Pongamia glabra* (fam. Leguminosea) has not been chemically examined so far, even though most other parts of the tree[1-5] have been. The hexane extract of the heart-wood, when subjected to thin layer chromatography on silica gel, showed as many as twenty-two distinct but closely moving spots. The concentrated hexane extract was chromatographed on a column of neutral alumina using hexane (fraction-1) and hexane with increasing ratios of benzene (4 : 1, fraction-2; 3 : 1, fraction-3; 1 : 1, fraction-4; 1 : 2, fraction-5) as eluants.

The hexane eluant (fraction-1) was found to contain waxy material only. The hexane-benzene (4 : 1, fraction-2) gave a solid which crystallised from methanol as shining needles with m.p. 138°. It gave positive Liebermann-Burchard test. Its acetate melted at 134°. The compound was identified as β-sitosterol by comparing with an authentic sample.

The hexane-benzene (3 : 1, fraction-3) on concentration gave a deep red oily residue. It showed two orange red spots besides a number of spots as minor constituents when subjected to TLC on silica gel plates using benzene as developing solvent. It was subjected to preparative TLC on silica gel using benzene as solvent. Two compounds separated as two orange red bands. The compound from the upper band crystallized from hexane as bright red needles. It was named Pongachalcone-I. From the lower band was obtained the second red compound.

Pongachalcone-I has m.p. 108° (Found C, 75·21; H, 6·13; OCH_3, 9·45; $C_{21}H_{20}O_4$ requires C, 74·98; H, 5·95; OCH_3, 9·5%), R_f 0·86. It gave characteristic test for chalcones with $SbCl_3$ in CCl_4 producing a deep red copious precipitate. $\lambda_{max.}$ 358 nm (4·31), 306 nm (4·24) and 238 nm (4·19); peak at 358 nm shifted to 398 nm in the presence of $AlCl_3$ indicating the presence of chelated hydroxyl group. $\nu_{max.}^{CHCl_3}$ 3575 (broad band, chelated hydroxyl), 1640 (chelated carbonyl), 1340 cm^{-1} (gem-dimethyl). Alkaline permanganate oxidation of the compound yielded benzoic acid. The 100 MHz NMR spectrum showed signals at τ 8·55 [6 H, singlet $C(CH_3)_2$], τ 6·05 (3 H, singlet, OCH_3), τ 4·55 (1 H, doublet, J = 10 Hz), τ 3·35 (1 H, doublet, J = 10 Hz) (chromene ring double bond protons). Mass spectrum of Pongachalcone-I showed a molecular ion m/e 336 and other fragment ions at m/e 321 (M − 15), m/e 259 (M − 77), m/e 232 (M − 104), m/e 217 (M − 15 − 104), m/e 244 (M − 15 − 17), m/e 131 and m/e 103. The peaks at m/e (M − 77) and m/e 232 (M − 104) in its mass spectrum are due to the loss of a phenyl group and a neutral styrene molecule indicating that the ring A is unsubstituted. From the above results Pongachalcone-I can be assigned structure I or its linear isomer.



(I)