

(Dedicated to the memory of Professor Arthur Erdélyi)

## CHEMICAL EXAMINATION OF STEMS OF PLUMBAGO ZEYLANICA

by

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*Plumbago zeylanica* (F. Plumbaginaceae) is distributed throughout India. The roots of the plant revealed a new plumbagin and 3-chloroplumbagin [4]. Later on 33' biplumbagin and five other constituents ([2], [3]) were also reported. From the literature it seems that no chemical examination was made from the stems of the plant

The stems of the *Plumbago zeylanica* were collected from the interior of the Bundelkhand region and botanically identified. The stems of the plant were successively extracted with petroleum ether (60-80) and benzene. The benzene extract yields a compound 'A' m. p. 77°C; benzoyl derivative; m. p. 145°C. The compound 'A' was identified as plumbagin by chemical degradations and special measurements. Finally, the structure of compound 'A' was confirmed by spectral and degradative reactions.

### EXPERIMENTAL

#### Isolation and purification of compound :

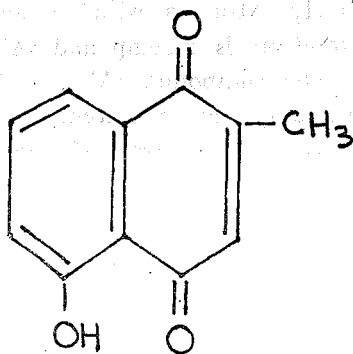
The concentrated benzene extract of *Plumbago zeylanica* revealed the presence of many constituents on TLC. The extract was placed for chromatography on silica gel column. A pigment 'A' was isolated in a state of reasonable purity. The compound was purified by two dimensional thin layer chromatography using silica gel G and solvent system, chloroform : methanol (9 : 1). The compound 'A' was crystallised in chloroform as orange yellow needles (m. p. 77°C).

**Study of Compound 'A' :**

Compound 'A' Orange - yellow crystalline solid (m. p. 77°C), is very soluble in organic solvents such as ether, benzene, chloroform acetone and hot alcohol. In acidic medium it gave pink colour. The combustion and molecular weight determination indicates an aromatic ring compound. The deep violet colour with neutral ferric chloride solution indicates the presence of phenolic (—OH) group in the compound. On benzylation it gave a benzoyl derivative (m. p. 145°C), which showed that the benzene ring contains one methyl group. Elemental analysis and high resolution mass spectrometry established the formula as  $C_{11}H_8O_3$ . The compound 'A' was identified as 2-methyl-5-hydroxy 1-4-naphthaquinone by chemical

degradation [1] and spectral measurements.  $\lambda_{\max}^{95\% \text{ EtOH}}$  (log  $\epsilon$ ) ; 210 (4.53), 255 Sn (4.07), 267 (4.08), 424 (3.67) mm.  $\lambda_{\max}^{95\% \text{ EtOH} + \text{OH}^-}$  log ( $\epsilon$ ) ; 211 (5.04), 273 (4.00), 575 (3.84) mm. ;  $\nu_{\max}^{\text{KBr}}$  : 1160, 1640  $\text{cm}^{-1}$ ,  
 NMR :  $\delta$  ( $\text{CCl}_4$ ) 2.02, d ( $J=1.5\text{C/S}$ ), 2— $\text{CH}_3$  ; 6.58,  $\rho$  ( $J=1.5\text{ C/S}$ ) C—3H ; 6.92—7.08,  $\rho$  C—6H, 7.33—7.46, t, C—7 and C—8H, 11.73, S, exchangeable with  $\text{D}_2\text{O}$  C—5OH.

Its m. p. (77°C) is same as plumbagin reported in the literature. Finally the identity of the compound 'A' was established by T. I. R., N. M. R. and Mass spectral data.

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