This large shift in λ_f, also indicates the occurrence of hydrogen bonding in the excited state of the molecule.

There are two prominent absorption bands: Band I at (309–323 nm) and the other one, band II at a shorter wavelength (205–228 nm). The absorption band II at (205–228 nm) is absent in non-polar solvents while it is quite intense in polar solvents. The presence of band II in polar solvents can be attributed to solvent–solute interaction in the ground state.

The natural lifetimes (τ_0) in different solvents, calculated using relation (1), are given in table 1. The value of τ_0 lies between 2 and 2.8 ns. The τ_0 value is slightly higher in polar solvents, viz. water and alcohols as compared to non-polar solvents like cyclohexane, toluene, etc. Further the fluorescence lifetime can be calculated using the relation[7]:

$$\tau_f = q_f \tau_0, \qquad (2)$$

where q_f is the quantum yield of fluorescence.

The fluorescence polarization measurements give information about the changes in structure brought about by external factors, viz. solvent, substituents, pH, changes in temperature, etc. As discussed above τ_0 and q_f change with solvent and it can be seen that these changes agree with changes in polarization. This becomes evident from the fact that τ_f in conjunction with the Perrin's formula can explain satisfactorily the observed variation in polarization in different solvents. According to Perrin's relation[7]:

$$\left(\frac{1}{p}-\frac{1}{3}\right) = [(1/p_0)-\tfrac{1}{3})]\,[(1+RT\tau_0 q_f)/\eta V_0]. \qquad (3)$$

Figure 1 shows the graph between $1/p$ vs $(\tau_0 q_f/\eta)$ where η is the viscosity of the solvent. This graph is linear and shows that fluorescence depolarization is essentially due to rotational relaxation of the molecule according to relation (3).

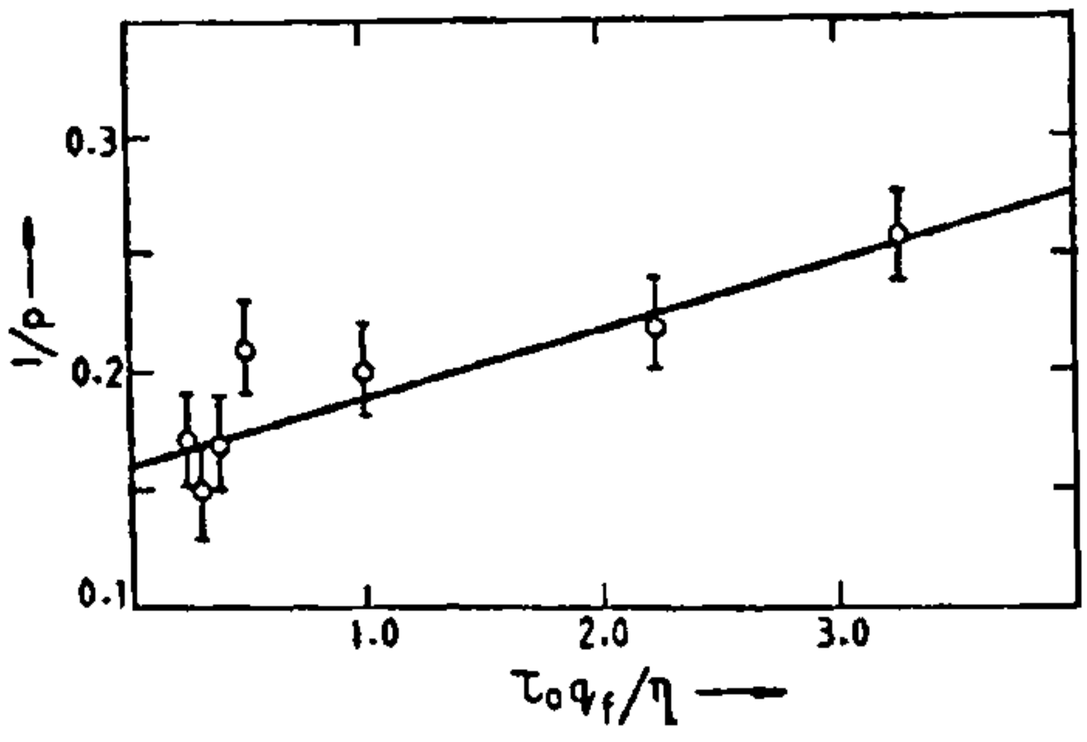

Figure 1. Plot of $1/p$ versus $\tau_0 q_f/\eta$.

In the present study it has been shown that: (i) Absorption and fluorescence spectra of 4-methyl-5, 7-diethoxy coumarin depend on the polarity of the solvent. The fluorescence in non-polar solvents is weak; (ii) Fluorescence efficiency changes with solvent polarity; (iii) τ_0 is higher in polar solvents as compared to non-polar solvents; (iv) Fluorescence depolarization is due to rotational relaxation of the fluorescent molecule.

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OCCURRENCE OF LUPEOL IN *CALOTROPIS PROCERA* LATEX

RADHA PANT and KSHAMA CHATURVEDI
Chemistry Department, Allahabad Agricultural Institute, Allahabad 211 007, India.

CALOTROPIS PROCERA latex has been extensively used in Indian medicine[1]. On account of its irritant action on skin and the mucous membrane and due to the presence of cardioactive poisons, the latex has been employed as an arrow poison by the natives of Africa and Columbia[2]. Several investigators[3–8] have chemically analysed the latex and isolated a number of cardioactive glycosides.

The present communication describes the hitherto

unreported detection and isolation of the pentacyclic triterpene alcohol lupeol in *C. procera* latex.

Fresh *C. procera* latex (100 ml) was hydrolysed in a round-bottomed flask with alcoholic potash (400 ml, 20% w/v) for 72 h. At the end of the reaction alcohol was distilled off till no smell thereof was detectable. The contents of the flask were transferred to a litre beaker and the last traces of ethanol removed by heating for another 30 min. The cooled alcohol-free hydrolysate was extracted with diethyl ether, the ethereal layer removed, ether distilled off and the unsaponifiable material filtered, washed with water and dried (10 g).

The hydrolysed product (5 g) was boiled with ethanol for about 10 min and filtered; on cooling, fine needles were deposited. Repeated crystallization of the compound with ethanol yielded thin long needles melting at 214–215°C.

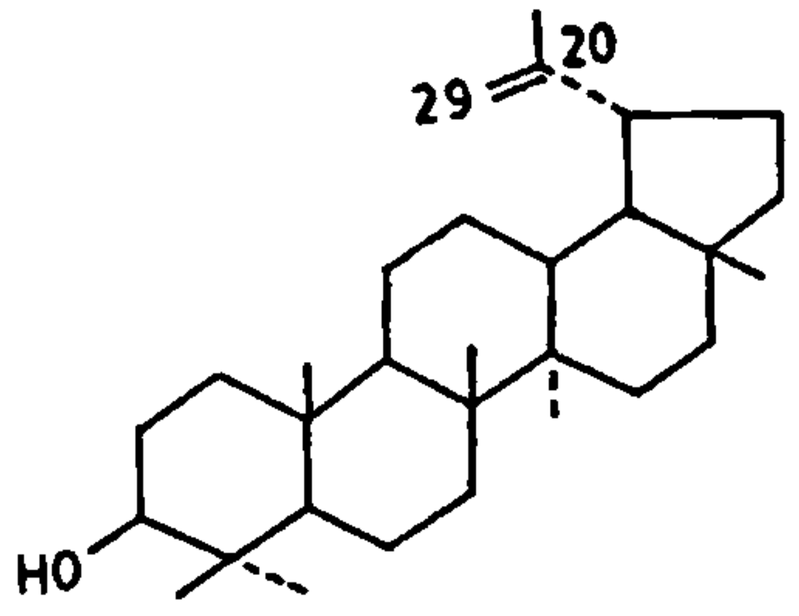
Elemental analysis (C, 85.39%; H, 11.76%) and molecular weight 426 as observed from mass spectrum indicated the molecular formula to be $C_{30}H_{50}O$ which requires C, 85.5% and H, 11.7%.

The compound responded positively to all colour reactions characteristic of terpenoids. With 2:6-tert-butyl-*p*-cresol in ethanol[9] the compound developed a violet colour suggesting it to be a pentacyclic triterpene.

On heating with acetic anhydride and pyridine the compound yielded an acetate melting at 216–218°C answering to the molecular formula $C_{32}H_{52}O_2$. The presence of the $-OH$ group in the parent compound was further confirmed by the absorption band at 3200 cm^{-1}, registered in the IR spectrum. The absorption bands exhibited at 2933 cm^{-1}, 1381 cm^{-1} and 1362 cm^{-1} evince the presence of $C\text{-}CH_3$ groups as well.

The compound decolorized bromine water in CCl_4 and reacted with iodine to give a yellow colour revealing its unsaturated nature. It neither gave any colour with tetranitroethane[10] nor did it exhibit any terminal UV absorption typical of 12:13 double bond encountered in triterpenes of α and β-amyrin series[11]. Hence the compound has been considered as lupeol. This assumption is supported by the IR spectrum projected absorption bands at 1641 cm^{-1} and 855 cm^{-1} which have been considered as characteristic of 20:29 double bond of a pentacyclic triterpene, lupeol[12]. The identity of the compound was also confirmed by its mixed melting point with an authentic sample of lupeol as well as with its acetyl derivative.

In view of the above observations the compound isolated from the unsaponifiable fraction of *C. procera* latex has been identified as a pentacyclic triterpenol with a normal 3-hydroxyl group. This is in accordance with the optical rotation determined as $[\alpha]_D^{20} + 33(CHCl_3)$ and in conformity with other triterpenols isolated from natural sources. Accordingly, the compound has been assigned the structure given below.



19 April 1988

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