

Figures 3-4. Micrograph showing single hole breakdowns ( $\times 450$ ). 4. pattern of total destruction.

$$F_b \simeq \frac{Q_{\text{eff}}}{kT} \frac{\bar{E}}{q} \frac{1}{\omega}$$

where  $Q_{\text{eff}}$  is the effective height of the potential barrier at the cathode-dielectric interface,  $E$  the difference between the mean energy of an electron when it is able to ionize and the mean energy of the electrons emerging from an ionization event,  $q$  the electronic charge,  $k$  the Boltzmann's constant and  $T$  the absolute temperature. This equation shows an explicit dependence of the breakdown field strength on temperature. The temperature dependence observed in the present study can be explained satisfactorily on the basis of electron-electron scattering.

The occurrence of single hole breakdown which has been shown in figure 3 can also be accounted for using the electronic avalanche mechanism. One of the limitations of Forlani and Minnaja's theory is that it does not mention other breakdown events, such as the destruction of the films due to thermal instabilities at high fields. In such cases, Klein's theory of localized electronic breakdown<sup>10</sup> gives a more appropriate explanation. The total destruction produced on the films as shown in figure 4, can be explained on the basis of Klein's theory.

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### STRUCTURE OF A NEW FLAVONE GLYCOSIDE FROM *IXORA ARBOREA* STEM.

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*Ixora arborea* (N.O. Rubiaceae) is reputed for its medicinal importance<sup>1,2</sup>. Literature survey revealed that no work has been done on the stem of this species, and only little work is reported on other species<sup>3</sup>.

The yellow coloured glycoside,  $C_{21}H_{20}O_{11}$ , m.p. 148-50° was isolated from the ethyl acetate extract of the water soluble fraction of ethanolic concentrate of the stem. It was found to be a single entity by PC and TLC.

Acid hydrolysis (7% ethanolic  $H_2SO_4$ ) of the glycoside afforded an aglycone and a sugar which was identified as D-galactose by PC and osazone formation and confirmed by direct comparison with the authentic sample of D-galactose.

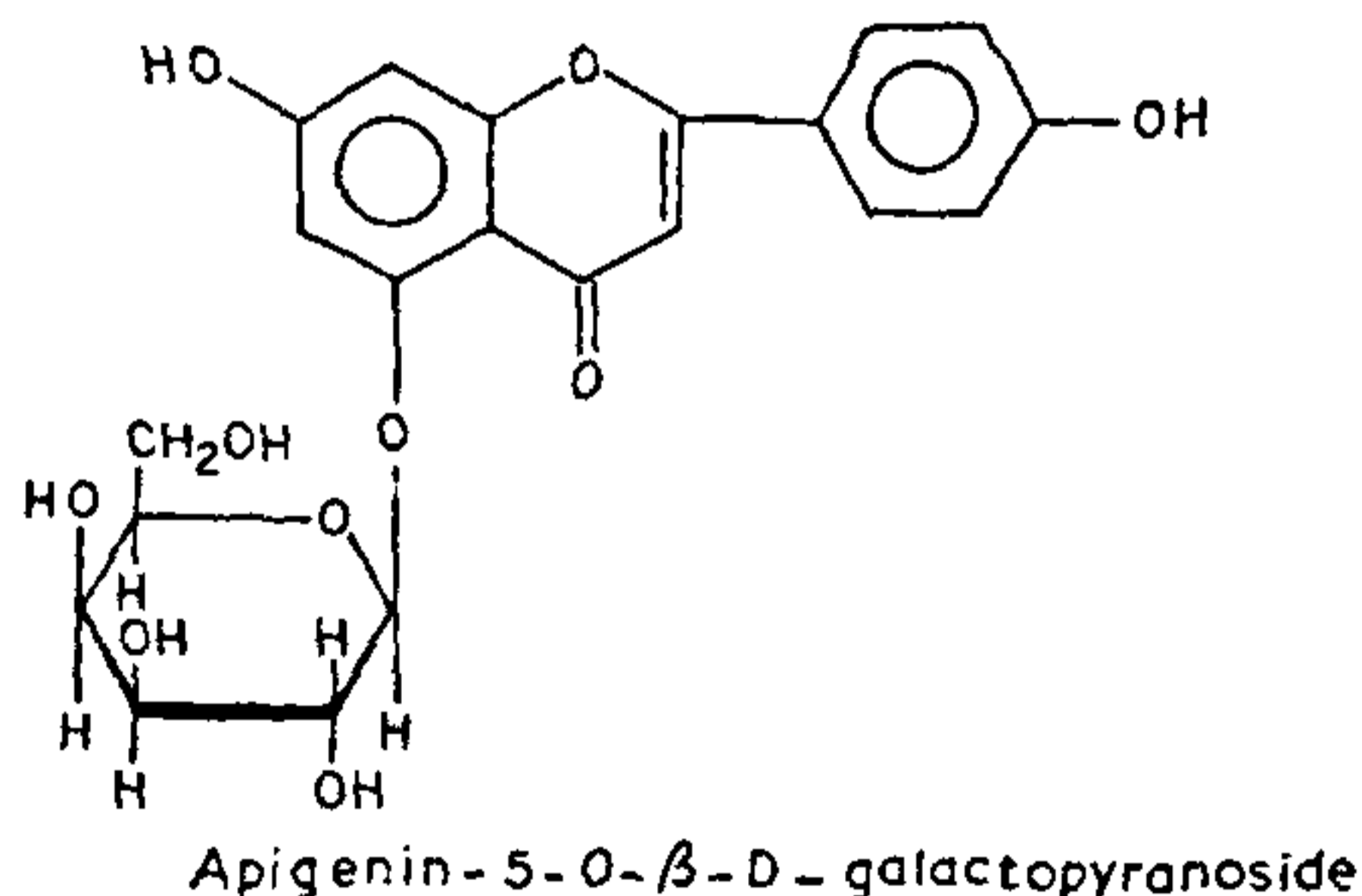
The aglycone,  $C_{15}H_{10}O_5$ , m.p: 338-40° was assigned a flavone structure on the basis of UV data, colour reactions and degradation studies. It was found to contain three-OH groups as it formed a triacetate (m.p. 175-78°) (IR peak at 3350  $cm^{-1}$ ) and no methoxyl group (negative results in Zeisel's estimation). Positions of different groups were established by different colour reaction and UV shifts with different reagents<sup>4</sup>. A bathochromic shift of 38 nm with 1% methanolic  $AlCl_3$  and a bathochromic shift of 7 nm with fused sodium acetate indicated the presence of —OH at positions-5 and -7 respectively. The remaining third —OH group was located on the basis of results of potassium permanganate oxidation. The aglycone

on oxidation gave *p*-hydroxybenzoic acid, m.p. 212° (lit. 214°). Degradation with 50% ethanolic KOH gave *p*-hydroxybenzoic acid and phloroglucinol m.p. 216° (lit. 218°) clearly indicating the presence of hydroxyl groups at positions-5 and -7 in ring A and at position-4' in ring B. Thus the aglycone was assigned the structure of 5,7,4'-trihydroxy flavone-apigenin<sup>5</sup>.

The periodate oxidation showed the consumption of 2.02 moles of periodate with the liberation of 1.01 moles of formic acid per mole of the glycoside, suggesting the presence of only one sugar moiety in its pyranose form. Assignment of the sugar linkage was made by comparing the properties of the aglycone with those of the glycoside.

The aglycone but not the glycoside gave a positive test with vanillin hydrochloric acid reagent<sup>6</sup> for the presence of hydroxyl groups at position-5 and -7. This colour test indicated that the sugar is either linked at position-5 or -7. The sugar linkage at position-5 was confirmed by the fact that a bathochromic shift of 38 nm with 1% ethanolic solution of AlCl<sub>3</sub> was observed with the aglycone and not with the glycoside.

Further, the glycoside could be hydrolysed by heating with almond emulsion at 40–50° for 12 hr, indicating the presence of β-linkage. Hence on the basis of studies made so far, the glycoside was assigned the structure of Apigenin-5-O-β-D-galactopyranoside.



Dried and powdered stem of *Ixora arborea* was extracted with ethanol 6 hr daily for 20 days and the extract was kept in a refrigerator for 2 hr. A yellow deposit was obtained which was filtered and the filtrate concentrated and kept in a refrigerator for another two days. It was then concentrated and segregated into water soluble and water insoluble fractions by pouring into an excess of distilled water. The water insoluble material was filtered and the filtrate was concentrated and subjected to liquid-liquid extraction with increasingly polar solvents like petroleum ether, benzene, chloroform and ethyl acetate.

The ethyl acetate extract on concentration gave a yellowish compound, m.p. 148–50° which when purified by column chromatography over silica gel and crystallised from ethyl acetate: methanol mixture was

found to be a single entity by PC and TLC. Found: C = 56.18%; H = 3.50%; C<sub>21</sub>H<sub>20</sub>O<sub>11</sub> requires C = 56.25%; H = 4.96%.

I.R.: 3360, 1650, 1610, 1560, 1525, 1455, 1385, 1310, 1260, 1080 and 830 cm<sup>-1</sup>.

$\lambda_{\text{max}}^{\text{EtOH}}$ : 260 nm and 330 nm;  $\lambda_{\text{max}}^{\text{EtOH}} + \text{AlCl}_3$ : 330 nm;

$\lambda_{\text{max}}^{\text{EtOH}} \text{NaOAc}$ : 268 nm;  $\lambda_{\text{max}}^{\text{EtOH}} + \text{AlCl}_3$ : 330 nm;

The glycoside on hydrolysis with ethanolic H<sup>2</sup>SO<sub>4</sub> (50 ml, 7%) gave an aglycone and D-galactose. The aglycone was recovered as usual and crystallised from ethyl acetate and methanol mixture, as yellow needles, m.p. 338–40°, Found: C = 66.70%; H = 3.62%; C<sub>15</sub>H<sub>10</sub>O<sub>5</sub> requires, C = 66.66%; H = 3.70%.

I.R.: 3350, 1650, 1608, 1562, 1525, 1448, 1380, 1310, 1260, 1130 and 1090 cm<sup>-1</sup>.

$\lambda_{\text{max}}^{\text{EtOH}}$ : 263 nm and 334 nm;  $\lambda_{\text{max}}^{\text{EtOH}} + \text{AlCl}_3$ : 372 nm;

$\lambda_{\text{max}}^{\text{EtOH}} \text{NaOAc}$ : 270 nm;  $\lambda_{\text{max}}^{\text{EtOH}} + \text{NaOMe}$ : 338 nm;

SK thanks CSIR, New Delhi for financial assistance.

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## FOSSIL IMPRESSIONS OF JELLY-FISH IN THE NIMBAHERA LIMESTONE, SEMRI GROUP OF VINDHYAN SUPERGROUP OF ROCKS

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VINDHYAN Supergroup of rocks lack reliable fossils. Vascular microflora, algae and fungal spores, *Protobella jonesi* and *Fermoria minima* have however been reported from several places particularly from the Lower Vindhyan. This paper reports well pre-