

assistance from U.G.C., New Delhi, is gratefully acknowledged.

References

1. K. S. MUKHERJEE, P. K. GHOSH and SAH BODRUDDOJA, *Phytochemistry*, 1981, 20, 1441.
2. K. S. MUKHERJEE, P. K. GHOSH and R. K. MUKHERJEE, *Phytochemistry*, 1983, 22, 1296.
3. K. S. MUKHERJEE, P. K. GHOSH and M. K. BHATTACHARYA, *Phytochemistry*, 1982, 21, 2416.
4. K. S. MUKHERJEE, P. K. GHOSH and R. K. MUKHERJEE, *J. Indian Chem. Soc.*, 1985, 62, 77.
5. R. N. CHOPRA, S. L. NAYER and I. C. CHOPRA, "Glossary of Indian Medicinal Plants", C. S. I. R., New Delhi, 1956, p. 219.
6. K. R. KIRTIKAR and B. D. BASU, "Indian Medicinal Plants", Indian Press, Allahabad, 1935, Vol. 3, p. 1838.
7. O. E. EDWARD, G. FENIAK and M. LOS, *Can. J. Chem.*, 1962, 40, 1540.
8. P. SENGUPTA, S. N. CHAUDHURY and H. N. KHASTOIR, *Tetrahedron*, 1960, 10, 45.
9. I. HEILBORN and H. M. BUNBURY, "Dictionary of Organic Compounds", Eyre and Spottis Woode, London, 1965, Vol. 4, p. 2545.
10. W. SANDERMANN and M. H. SIMATUPANG, *Chem. Ber.*, 1964, 97, 588.
11. I. HEILBORN and H. M. BUNBURY, "Dictionary of Organic Compounds", Eyre and Spottis Woode, London, 1965, Vol. 3, p. 1339.

A New Anthraquinone Pigment from *Cassia mimosoides* Linn.†

K. S. MUKHERJEE*, P. BHATTACHARJEE,
R. K. MUKHERJEE and P. K. GHOSH**

Department of Chemistry, Visva-Bharati University,
Santiniketan-731 235

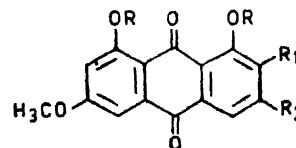
Manuscript received 8 July 1986, accepted 22 January 1987

IN our previous communication¹ we reported the isolation of an anthraquinone pigment, m.p. 160–62°, from the aerial parts (leaves and stems) of *C. mimosoides* Linn.². In the present paper a structure for the above pigment is advanced on the basis of spectral evidence.

The air-dried powdered aerial parts of *C. mimosoides* were successively extracted with petroleum ether (b.p. 60–80°) and chloroform. The concentrated chloroform extract of the defatted aerial parts was chromatographed over silica gel. Elution of the column with benzene–chloroform (1:1) mixture afforded a yellow solid which was crystallised from glacial acetic acid as yellow leaflets, $C_{16}H_{12}O_5$ (M^+ 284), m.p. 160–62°; gave positive test with methanolic magnesium acetate for anthraquinone³ and was found to contain one methoxy group as indicated by Zeisel experiment; λ_{max} (EtOH) 257, 267, 275sh, 288, 390, 415 and 435 nm; ν_{max} (KBr) 1 670 (non-chelated C=O), 1 640 (chelated C=O) and 1 675 cm^{-1} (unsaturation);

δ 3.90 (3H, s, Ar-OMe). These data, in conjunction with the fact that the pigment gives a dimethyl ether (4) $C_{18}H_{16}O_5$ (M^+ 322), m.p. 178–80°, on treatment with diazomethane, suggest that the compound is a 1,8-dihydroxyanthraquinone with one methoxy group^{4,5} like physcion (3).

The mass spectral analysis is also consistent with the above view. The mass fragmentation pattern of the pigment is typical of polysubstituted anthraquinone⁶ and showed significant peaks at m/z 285 ($M^+ + 1$), 256, 228, 198, 197, 183, 181 and 180 besides the molecular ion peak at m/z 284. The ^1H nmr spectrum (90 MHz, $CDCl_3$) of the compound displayed signals at δ 2.35 (3H, s, aromatic C-methyl), 3.90 (3H, s, one aromatic methoxy), 6.70 (d, J 2Hz, C_7 -H), 7.40 (d, J 2.5Hz C_2 -H), 7.60 (d, J 9Hz, C_3 -H) and 7.80 (d, J 9Hz, C_4 -H) assignable to four aromatic protons. The spectrum is practically identical with that of physcion except for the appearance of two doublets of one proton each in the aromatic region at δ 7.60 (d, J 9Hz) and 7.80 (d, J 9Hz) attributable respectively to C_3 -H and C_4 -H instead of two singlets of one proton each at δ 7.17 and 7.74 for C_3 -H and C_4 -H in the spectrum of physcion⁷. All these spectral observations reveal that the pigment differs from physcion in the position of aromatic C-methyl and hence may be formulated as 1,8-dihydroxy-6-methoxy-2-methyl-anthraquinone (1).



- 1; R-R₂-H, R₁-CH₃,
2; R-R₁-CH₃, R₂-H
3; R-R₁-H, R₂-CH₃,
4; R-R₂-CH₃, R₁-H

Acknowledgement

The authors are thankful to R.S.I.C., Bose Institute, Calcutta, for spectral analyses, and to U.G.C., New Delhi, for financial assistance.

References

1. K. S. MUKHERJEE, P. BHATTACHARJEE, R. K. MUKHERJEE and P. K. GHOSH, *J. Indian Chem. Soc.*, 1986, 63, 619.
2. R. N. CHOPRA, S. L. NAYER and I. C. CHOPRA, "Glossary of Indian Medicinal Plants" C.S.I.R., New Delhi, 1956, p. 54.
3. S. SHIBATA, M. TAKIDO and O. TANKA, *J. Am. Chem. Soc.*, 1950, 72, 2789.
4. M. BLOOM, L. H. BRIGGS and B. CLEVERLEV, *J. Chem. Soc.*, 1959, 178.
5. J. C. BREW and R. H. THOMPSON, *J. Chem. Soc.*, 1970, 2007.
6. H. BUDZIKIEWICZ, C. DJERASSI and D. H. WILLIAMS, "Interpretation of Mass Spectra of Organic Compounds", Holden-Day, San Francisco, 1965, p. 205.
7. M. SARGENT and O. N. D. SMITH, *J. Chem. Soc.*, 1970, 307.

†Presented in 22nd Annual Convention of Chemists, held at Ravishankar University, Raipur, 1985.

**West Bengal Pharmaceutical and Phytochemical Corpn. Ltd., Jalpaiguri.