

dormancy of the sclerotia of the fungus under study and it constitutes the first report.

Financial help by the Indian Council of Agricultural Research, New Delhi, in sponsoring the project entitled "Studies on false smut of rice" is gratefully acknowledged.

Department of Plant Pathology,
G.B. Pant University of

R. A. SINGH.
K. S. DUBEY.

Agriculture and Technology,
Pantnagar 263 14, September 8, 1979.

1. Singh, R. A., and Dubey, K. S., *Curr. Sci.*, 1976, 45, 772.
2. Bedi, K. S., *Indian Phytopath.*, 1958, 11, 29.
3. Brentzel, W. E., *Bull. N. Dak. agric. Exp. Stn.* 1947, 348, 20.
4. Lilly, V. G. and Barnett, H. L., *Physiology of the Fungi*, McGraw-Hill Book Company, Inc., New York, 1951, p. 464.
5. Mitchell, D. T., and Cooke, R. C., *Trans. Br. Mycol. Soc.*, 1968, 51, 721.
6. Terui, M. and Harada, Y., *Bull. Fac. Agric. Hisosaki Univ.*, 1966, 12, 24.
7. Weber, D. J. and Hess, W. M., *The Fungal Spore Form and Function*, John Wiley and Sons, New York, 1976, p. 895.

CHEMICAL COMPONENTS OF *EUCALYPTUS CITRIODORA* LEAVES

Eucalyptus citriodora (Family: Myrtaceae) is a valuable timber tree grown in Australia, India and many other countries. The leaves yield an essential oil (0.5-2.0%) which is used in soap perfumery and as a source of citronellal used in the manufacture of citronellol, hydroxy citronellal and menthol. Previous reports showed the presence of oil and flavonoids in the leaves¹⁻³ while the gum⁴ contained flavonoids and ellagic acid. The acetone extract of the leaves (800 gm) on column chromatography over silica gel yielded oil (0.5%) and four compounds A, B, C and D.

Compound A (600 mg) crystallised from ethanol as light pale yellow needles, m.p. 197-98°. It gave +ive Mg/HCl test and green colour with alcoholic FeCl₃. A yellow solution with strong greenish blue fluorescence was obtained on addition of a drop of conc. H₂SO₄ to the solution of A in CHCl₃-acetic anhydride. Dilution of the solution with chloroform gave blue fluorescence. $\nu_{\max}^{\text{Nujol}}$ 1643, 1626, 1590, 1509, 1426, 1377, 1331, 1306, 1259, 1177, 1116, 1027 and 977 cm⁻¹; $\lambda_{\max}^{\text{MeOH}}$ 281, 287 and 323 nm; NMR (δ , CdCl₂): 2.18 (s, 3H) and 2.36 (s, 3H) [two aromatic methyls], 3.82 (s, 3H) and 3.90 (s, 3H) [two aromatic methoxyls], 6.60 (s, 1H, 3-H), 7.05 (d, J = 20 cps, 2H) and 7.95 (d, J = 20 cps, 2H) [four

aromatic protons of the side phenyl], 12.96 (s, 1H, chelated hydroxyl). It formed an acetate, m.p. 245-46°. Compound A was identified as 5-hydroxy-4', 7-dimethoxy, -6,8-dimethyl flavone (Eucalyptin)⁵ by direct comparison with an authentic sample (m.m.p., Co-TLC and Superimposable IR Spectra).

Compound B (100 mg) has been identified as β -sitosterol⁶ by direct comparison with an authentic sample.

Compound C (400 mg) crystallised from methanol as silky needles, m.p. 312-14°, [α]_D + 9° (CHCl₃). It answered +ive L.B. test and formed an acetate m.p. 286-88°. It was identified as betulinic acid⁶ by direct comparison with an authentic sample (m.m.p., Co-TLC and Co-IR).

Compound D (800 mg) crystallised from chloroform-methanol as colourless needles, m.p. 288-90°, [α]_D + 69° (CHCl₃) and gave +ive L.B. test (pink → blue); $\nu_{\max}^{\text{Nujol}}$ 3500, 2965, 1690, 1040, 1000 and 722 cm⁻¹. It formed an acetate, m.p. 245-46°, [α]_D + 58° (CHCl₃); NMR (δ , CDCl₃): 0.80-1.20 (m, 21H, 7C-methyls), 2.02 (s, 3H, -OAC), 5.25 (m, 1H, one vinylic proton). Its identity was confirmed as ursolic acid⁷ by direct comparison with an authentic sample (Co-TLC, m.m.p. and Co-IR).

Thus the present investigation on the leaves of *E. citriodora* has revealed the presence of ursolic acid and betulinic acid which were not reported earlier from the Eucalyptus.

Thanks are due to Shri R. C. Ghosh, I.F.S., Director, Forestry Research, Forest Research Institute and Colleges, Dehra Dun and Dr. M. C. Tewari, Head of Utilisation Research, Forest Research Laboratory, Bangalore, for their valuable suggestions during the course of the investigations.

Forest Research Laboratory, RAMESHWAR DAYAL,
Bangalore 560 003,
September 10, 1979.

1. Jain, S. S., Saoji, A. N. and Desmukh, V. K., *Indian J. Pharm.*, 1976, 38, 57.
2. Maria Cerecer, J., Santos, E. and Crabbe, P., *Rev. Soc. Quim. Mex.*, 1974, 18, 269.
3. Elkeiy, M. A., Darwish, M., Hashim, F. M. and Khadega, A. Assm., *Bull. Fac. Pharm.*, 1964, 31, 83.
4. Satwalekar, S. S., Gupta, T. R. and Narasimha Rao, P. L., *J. Indian Institute of Science*, 1957, 39, 195.
5. Tikam C. Jain and Calvin, M. Banks, *Canad. J. Chem.*, 1968, 46, 2325.
6. Bengt, O. Lingren and Svahn, C. M., *Acta Chem. Scad.*, 1966, 20, 1720.
7. Zürcher, A., Jeger, O. and Ruzicka, L., *Helv. Chim. Acta*, 1954, 37, 2145.