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ERICACEAE AND OTHER FAMILIES

CHEMICAL CONSTITUENTS OF *ACTINODAPHNE AUGUSTIFOLIA*,
CROTON SPARSIFLORUS, *DUABANGA SONNERATIODES*, *GLYCOSMIS*
MAURITIANA, *HEDYOTIS AURICULARIA*, *LYONIA OVALIFOLIA*,
MICROMELUM PUBESCENS, *PYRUS PASHIA* AND *RHODODENDRON*
*NIVEUM**

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Plant

Actinodaphne augustifolia Nees—Lauraceae.

Occurrence. Evergreen forest of Western Ghat and Mahabaleshwar.

Leaves. Hexane soluble fraction of EtOH extractive (chromatographed over neutral alumina) yielded *hentriacontanone* $C_{31}H_{62}O$ m.p. 82° ; Oxime m.p. 59° ; *hentriacontanol* $C_{31}H_{64}O$ m.p. $81-82^\circ$; acetate $C_{33}H_{66}O_2$ m.p. $74-75^\circ$; β -sitosterol $C_{29}H_{50}O$ m.p. $135-137^\circ$; $[\alpha]_D -35^\circ$ † (m.p., mixed m.p., $[\alpha]_D$ and IR); acetate m.p. 134° , $[\alpha]_D -38^\circ$ and benzoate m.p. 145° . EtOAc soluble fraction (chromatographed over cellulose) *quercetin-3-rhamnoside* $C_{21}H_{20}O_{11} \cdot 2H_2O$, m.p. $182-186^\circ$. Acid hydrolysis furnished rhamnose (paper chromatography) and quercetin $C_{15}H_{10}O_7$ (m.p., mixed m.p., UV and IR of pentaacetate and pentamethyl ether). Methylation followed by hydrolysis gave 5:7:3':4'-tetramethyl-quercetin thus confirming the attachment of rhamnose at position 3 in the flavonoid ring.

Plant

Croton sparsiflorus Morong (syn. *C. bonplandianum* Bail) Euphorbiaceae.

Occurrence. Common weed throughout the plains of India.

Previous work. Leaves,¹ root,² plant,³⁻⁵ stem,⁶ and seeds.⁷

Leaves and Stem. Benzene soluble fraction of EtOH extractive (chromatographed over

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† IR determined in KBr, $[\alpha]_D$ in $CHCl_3$ and 60 Mc s N.M.R. in $CDCl_3$ with TMS as internal standard.

¹ S. K. SAHA, *Sci. Cul. Calcutta* **24**, 572 (1959).

² M. V. DABHOLKAR, *Trav. Sect. Sci. Tech. Inst. France* **1**, No. 3, 118 (1959).

³ C. S. PANDEY and J. D. TEWARI, *Chem. Ber.* **95**, 2623 (1962).

⁴ C. S. PANDEY and J. D. TEWARI, *J. Ind. Chem. Soc.* **39**, 545 (1962).

⁵ D. S. BHAKUNI and M. M. DHAR, *Experientia* **24**, 10 (1968).

⁶ D. S. BHAKUNI and M. M. DHAR, *Experientia* **25**, 354 (1969).

⁷ S. V. ANANTAKRISHNAN, S. ARAVAMUTHACHARI and V. S. GOVINDARAJAN, *Proc. Indian Acad. Sci.* **14A**, 609 (1941).

alumina). *β -sitosterol*, *taraxerol* $C_{30}H_{50}O$ m.p. 269–271°, $[\alpha]_D + 3.1^\circ$, acetate m.p. 295–297°, $[\alpha]_D + 9^\circ$ and benzoate m.p. 280–281°, $[\alpha]_D + 40^\circ$.

Plant

Duabanga sonneratioides Ham.—Lythraceae.

Occurrence. Eastern Himalaya, Assam and Andaman Islands.

Stem Bark. Benzene soluble fraction of EtOH extractive (chromatographed over neutral alumina) gave *hentriacontanol* and *β -sitosterol* (m.p., mixed m.p., IR and acetate).

Plant

Glycosmis mauritiana (Lam.) Tanaka—Rutaceae.

Occurrence. Eastern parts of India.

Leaves and Stem. Light petroleum and ether soluble fraction of EtOH extractive (chromatographed over alumina) gave *hentriacontane* $C_{31}H_{64}$ m.p. 64–65° and *hentriacontanol* (m.p., mixed m.p., $[\alpha]_D$, IR) Friedelin $C_{30}H_{50}O$ m.p. 245–248°. $NaBH_4$ reduction yielded an alcohol $C_{30}H_{52}O$ m.p. 275–278°, $[\alpha]_D + 21^\circ$ and acetate $C_{32}H_{54}O_2$ m.p. 285°, $[\alpha]_D + 36^\circ$ (m.p., mixed m.p., $[\alpha]_D$, IR and NMR). *Vitexin* $C_{21}H_{20}O_{10}$, yellow plates, m.p. 262–263° (from *n*-BuOH soluble fraction) λ_{max} 271 and 335 nm (EtOH) (m.p., IR and NMR). Heptaacetate $C_{35}H_{34}O_{17}$ m.p. 252–254°.

Plant

Hedyotis auricularia Linn. (syn. *Oldenlandia auricularia* K. Schum.)—Rubiaceae.

Occurrence. All over India.

Previous work. Root.^{8,9}

Leaves and stem. Benzene soluble fraction of EtOH extractive (chromatographed over alumina) yielded *β -sitosterol*, *stigmaterol* $C_{29}H_{48}O$, m.p. 168–170°, $[\alpha]_D - 55^\circ$ (m.p., mixed m.p., IR, NMR and acetate). Benzene insoluble fraction resolved through acetate into *oleanolic acid* $C_{30}H_{48}O_3$ m.p. 304–305°, $[\alpha]_D + 78^\circ$, acetate $C_{32}H_{50}O_4$ m.p. 218–220°, $[\alpha]_D + 68^\circ$ and *ursolic acid* $C_{30}H_{48}O_3$ m.p. 284–285°, $[\alpha]_D + 67^\circ$, acetate $C_{32}H_{50}O_4$ m.p. 282–284°, $[\alpha]_D + 68^\circ$ (m.p., $[\alpha]_D$, IR, NMR, methyl ester and acetate).

Plant

Lyonia ovalifolia (Wall) Drude (syn. *Pieris ovalifolia* D. Don)—Ericaceae.

Occurrence. Himalaya (throughout 600 to 3900 M).

Previous work. Sprouts,¹⁰ leaves,¹¹ wood^{12,13} and bark.¹⁴

Leaves. Hexane and ethyl acetate soluble fraction of EtOH extractive saponified with 5% Alc. KOH. Non-saponified portion (chromatographed over alumina). Yielded *hexacosane*, *hexacosanol*, *β -sitosterol* and *taraxerol*.

Plant

Micromelum pubescens Blume—Rutaceae.

Occurrence. Central and Eastern Himalayas, Assam, Khasia.

⁸ B. B. DEY and S. LAKSHMINARAYANAN, *Arch. Pharm.* **271**, 485 (1933)

⁹ A. N. RATNAGIRISWARAN and K. VENKATACHALAM, *J. Ind. Chem. Soc.* **19**, 389 (1942).

¹⁰ M. YASUE, Y. KATO, T. KISHIDA and H. OTA, *Chem. Pharm. Bull. Tokyo* **9**, 171 (1961).

¹¹ M. YASUE, T. KAIYA and A. WADA, *Yakugaku Zasshi* **87**, 581 (1967).

¹² M. YASUE, Y. KATO, M. SUGIMATO and J. SAKAKIBARA, *Yakugaku Zasshi* **88**, 789 (1968)

¹³ M. YASUE and Y. KATO, *Yakugaku Zasshi* **81**, 526 (1961).

¹⁴ F. HIDEOMI, W. KAZUO and I. TSUGUTAKA, *Yakugaku Zasshi* **89**, 382 (1969).

Previous work. Stem bark.¹⁵

Leaves and Stem. Benzene extract of EtOH extractive (chromatography over alumina) gave *hentriacontane*, *hentriacontanol* and β -*sitosterol*.

Plant

Pyrus pashia—Rosaceae.

Occurrence. Temperate Himalaya, Khasia Mountains at 5000 ft.

Previous work. Bark and leaves.¹⁶

Stem. Benzene soluble fraction of EtOH extractive (chromatographed over alumina) yielded *hentriacontanol*, β -*sitosterol*, *friedelin*, α -*amyrin* C₃₀H₅₀O m.p. 180°, [α]_D +85° (m.p., mixed m.p., IR and acetate). Arborinol C₃₀H₅₀O m.p. 275°, [α]_D + 39° (m.p. and IR), acetate C₃₂H₅₂O₂ m.p. 235°, [α]_D +18°.

Plant

Rhododendron niveum—Hook.f.—Ericaceae.

Occurrence. North East Himalaya.

Plant. Benzene soluble fraction of EtOH extractive (chromatographed over alumina) yielded β -*sitosterol* and *friedelin*.

¹⁵ A. CHATTERJEE, C. P. DUTTA and S. BHATTACHARYA, *Sci. Cul. Calcutta* **33**, 371 (1967).

¹⁶ D. CHAKRAVARTI, N. K. ROY and N. N. CHAKRAVARTI, *J. Ind. Chem. Soc.* **41**, 83 (1964).

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FAGACEAE

PHENOLICS OF *QUERCUS RUBRA* WOOD

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Abstract—Sixteen phenolics are positively identified in oak wood; seven had not been reported in oaks. Several additional phenolics are tentatively identified. Bark is briefly investigated. Lyoniside is shown to be lyoniresinol 2a-O-xyloside.

Plant. *Quercus rubra* L.—Fagaceae (northern red oak).

Uses. Timber.

Previous work. Tannin content of wood 1.8%.¹ Hamamelitannin in bark.²

Isolation. Extraction of the wood proceeded as shown in the following tabulation:

* Deceased. See *Phytochem.* **9**, 679 (1970). Reprint requests and correspondence should be addressed to Dr. John W. Rowe at the U.S. Forest Products Laboratory.

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‡ Maintained in cooperation with the University of Wisconsin.

¹ A. J. RUSSELL, *J. Amer. Leather Chem. Assoc.* **39**, 176 (1944).

² W. MAYER, W. KUNZ and F. LOEBICH, *Ann. Chem.* **688**, 232 (1965).