

petroleum, ether and acetone extracts while a proanthocyanidin was obtained from acetone and alcohol extracts. The latter was purified by repeated fractional precipitation and identified through its flavylum salt.

*Betula papyrifera*. Bark: betulin (1.5%), lupeol, acetyl oleanolic acid, betulinic acid, oleanolic acid,  $\beta$ -sitosterol and procyanidin (in low yield). Heartwood: betulin, lupeol,  $\beta$ -sitosterol and procyanidin (yield very much less than that from the bark). The results revealed close resemblance to the Indian wood *Betula utilis*.<sup>5</sup> These two woods had similar physical appearance though the outer barks had minor differences.

*Betula lenta*. Bark: lupeol (0.15%), betulin (0.05%); methyl salicylate,  $\beta$ -sitosterol, lupenone and procyanidin in comparatively low yield. Heartwood: lupeol, betulin, methyl salicylate,  $\beta$ -sitosterol,  $\beta$ -sitosterol- $\beta$ -D-glucoside, acetyl methyl betulinate and procyanidin (low yield).

*Betula alleghaniensis*. Bark: lupenone (0.08%); betulin, lupeol and procyanidin in traces. Heartwood: Betulin, lupeol,  $\beta$ -sitosterol,  $\beta$ -sitosterol- $\beta$ -D-glucoside, acetyl methyl betulinate and procyanidin (low yield).

**Conclusion.** The occurrence of betulin and lupeol seems to be common among the *Betula* species. The bark of *B. papyrifera* is a rich source for betulin. The presence of methyl salicylate is characteristic of *B. lenta*. The rare occurrence of acetyl methyl betulinate has been noted in two of the three species examined by us. The only earlier report about this compound is by Paasonen<sup>6</sup> who obtained it from the moist saw dust extractives of birch trees.

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<sup>5</sup> V. M. CHARI, S. NEELAKANTAN and T. R. SESHADRI, *Indian J. Chem.* **6**, 231 (1968).

<sup>6</sup> PAULI K. PAASONEN, *Paperi Puu* **49**, 3 (1967). *Chem. Abstr.* **66**, 77129 (1967).

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## CELASTRACEAE

### CONSTITUENTS OF *EUONYMOUS EUROPEAS*

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A STUDY of *Euonymus europeas* has shown the presence of lipids, zeaxanthin, kaempferol and sugars in the aril of the seed capsules.

The air dried aril of ripened seeds of *Euonymus europeas* was extracted with boiling petrol (b.p. 60–80°). The concentrated extract was column chromatographed on alumina pd developed with petrol. The colourless elute, on concentrating to an oil (20%), was udged to be mainly triglyceride (TLC) and found (GLC of the methyl esters) to be mainly a mixture of the following compositon: 16:0, 19.3%; 16:1, 8.4%; 18:0, 1.8%; 18:1,

26.0% and 18.2, 38.3%. It is apparent that the aril oil contains the usual range of  $C_{16}$  and  $C_{18}$  acids and that it is particularly rich in unsaturated  $C_{18}$  components ( $\sim 65\%$ ).

An orange-red band at the top of the column, which failed to be eluted with ethyl acetate-petroleum (1:2), was extracted with acetone and the concentrate crystallized from ethyl acetate-petroleum (b.p. 60–80°) to furnish a crimson coloured powder (0.1%), m.p. 203°;  $\lambda_{\max}$  (EtOH) 478, 451, 430 infl. 276 nm;  $\nu_{\max}$  ( $CS_2$ ) 963, 1035, 1355, 2920, 3360  $cm^{-1}$ ;  $\tau(CDCl_3)$  7.85, 8.05, 8.27, 8.72, 8.93 relative intensities ca. 2:2:3:3:2;  $m/e$  568.428,  $C_{40}H_{56}O_2$  requires 568.428. This confirming, with additional physical constants, the presence of zeaxanthin, also found by earlier workers.<sup>1,2</sup>

The residue from the petrol extraction was further extracted with boiling MeOH. The concentrated extract separated into two fractions. The soluble fraction, showed the presence of only one component, and by mixed TLC with an authentic specimen of kaempferol showed no separation. Acetylation furnished the acetate which was compared (i.r., TLC) and found identical with an authentic specimen of kaempferol tetra-acetate.

The sparingly soluble fraction was shown (TLC) to be a mixture of glucose, fructose and rhamnose.

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<sup>1</sup> L. ZECHMEISTER and P. TUZON, *Z. Physiol. Chem.* **196**, 199 (1931).

<sup>2</sup> P. KARRER and E. KRAUS-VOITH, *Helv. Chim. Acta* **31**, 802 (1948).

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## COMPOSITAE

### TRITERPENOID AND STEROID CONSTITUENTS OF SOME *LACTUCA* AND *AGERATUM* SPECIES OF HONG KONG

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**Abstract**—Five closely related triterpene acetates have been obtained from *Lactuca denticulata*. These together with the isolation of other triterpenoids and steroids from also *L. indica*, *Ageratum conyzoides* and *A. houstonianum* are reported.

## INTRODUCTION

EARLY work on the latex of *L. virosa* and *L. sativa* revealed the presence of two isomeric alcohols,  $\alpha$ - and  $\beta$ -lactucero<sup>1</sup> which were later proved to be mixtures, the former being impure taraxasterol, which was shown to be present together with  $\beta$ -amyrin and germanicol in the latex of *L. virosa*.<sup>2</sup> Other classes of compounds reported in *Lactuca* species were

<sup>1</sup> Elsevier's *Encyclopaedia of Organic Compounds*, Series III, Vol. 14, pp. 606–607 (1940) and Supplement, pp. 1159–1160 (1952).

<sup>2</sup> J. C. E. SIMPSON, *J. Chem. Soc.* 283 (1944).