AN EXAMINATION OF *ORMOSIA EMARGINATA* BENTH. OF HONG KONG*

By H. R. Arthur† and S. N. Loo†

Ormosia emarginata Benth. of Hong Kong is known locally as *lup yip hung tou* (red bean with indented leaf). While other *Ormosia* spp. are used medicinally in the Orient, *O. emarginata* is seldom so used and is regarded in Hong Kong as being poisonous in both the leaves and the stems.

Our examination of this plant reveals in the *leaves*: α-amyrin, taraxerol, β-sitosterol, betulin, and a long-chain alcohol identical with that obtained[1] from Hong Kong *Quercus* spp.; in the *stems*: taraxerol, lupenone, lupeol, β-sitosterol, betulin, and a long-chain alcohol and long-chain ketone identical with those obtained from Hong Kong *Quercus* spp.[1] and also the alkaloids ormosanine and panamine.

Unlike our investigation, which led to the isolation of several triterpenoids, a steroid, a long-chain alcohol, and ketone as well as alkaloids, previous work seems to have been directed only toward the alkaloidal constituents. Twenty-three alkaloids have been reported[2–10] from four species of *Ormosia* and at least 17 of them appear to be different. Structural relationships among *Ormosia* alkaloids have been discussed.[9]

Experimental

Compounds isolated were identified by m.p., analysis, optical rotation, the preparation of one or more derivatives, and in all instances but one (and in that case and in others paper chromatography was used), mixed m.p. and infrared spectra.

Air-dried *leaves* (7·3 kg) were extracted with light petroleum at room temperature. The concentrated extract was chromatographed on alumina (1 kg). Elution with light petroleum (b.p. 60–80°) gave the long-chain alcohol (3·3 g), m.p. 69–70°. Elution with benzene gave firstly α-amyrin (3·1 g), m.p. 178–181°, then taraxerol (0·56 g), m.p. 282–283°. Elution with benzene/chloroform (9 : 1) gave β-sitosterol (0·53 g), m.p. 138–139°. Elution with chloroform yielded betulin (0·82 g), m.p. 234–235°.

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† Department of Chemistry, University of Hong Kong, Hong Kong.

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Air-dried *stems* (10·4 kg) were milled, then extracted with light petroleum (b.p. 60–80°), and then with ethanol at room temperature.

The petroleum extract was concentrated to 1 l. After 24 hr taraxerol (8·3 g), m.p. 282–283°, was collected. The filtrate was chromatographed on alumina (300 g). Elution with light petroleum gave the long-chain alcohol (0·35 g), m.p. 69–70°, followed by the long-chain ketone (0·23 g), m.p. 68–70°, followed thirdly by lupenone (0·13 g), m.p. 166–169°, which itself was followed by lupeol (11·3 g), m.p. 195–201°. Elution with benzene/petroleum (3 : 2) gave β-sitosterol, m.p. 138–139°. Elution with chloroform/benzene (3 : 2) gave betulin (0·24 g), m.p. 234–235°.

The ethanol extract was distilled. The syrup obtained was brought to pH 8 (Na_2CO_3 solution), then extracted with chloroform. The latter extract, after shaking with sodium hydroxide solution, was extracted with 2N HCl. The remaining chloroform layer was concentrated to dryness to give (A). The acid extract was basified with sodium hydroxide solution and then extracted with chloroform; the solvent was evaporated to 20 ml (B).

The residue (A) was extracted with ether and the tar was discarded. The ethereal solution was evaporated to dryness and the residue taken up in benzene/light petroleum (1 : 9) and chromatographed on 150 g alumina. Elution with benzene/light petroleum (3 : 7) gave lupeol (0·23 g), m.p. 195–201°. Elution with the mixed solvent (7 : 3) gave β-sitosterol (0·3 g), m.p. 138–139°.

Solution (B) crystallized to give ormosanine (0·3 g), m.p. 167–168°. The mother liquor was distilled and the residual brown syrup (4·2 g) was dissolved in benzene and chromatographed on alumina (200 g). Elution with benzene gave a yellow oil from which panamine (2·8 g), m.p. 37–39° (diperchlorate, m.p. 275–279°; dipicrate, m.p. 229–232°), was obtained.

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