Phytochemical Investigation of *Asterella angusta*

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IN the course of investigation of different Indian Bryophytes having insecticidal and biological activities we undertook the chemical investigation of hitherto uninvestigated plant *Asterella angusta* (Reboutiaceae) which grows abundantly in the Himalayan region and also in Pachmarhi (M.P.).

Here we report the isolation and characterisation of two known triterpenoids and one known sesquiterpenoid from this plant.

Asterella angusta was collected from Pachmarhi (M.P.) in September 1989. Voucher specimens were identified from Botanical Survey of India, Allahabad.

The air-dried and ground material (1.2 kg) was extracted with petroleum ether (b.p. 60–80°). The petroleum ether extract was concentrated under reduced pressure to yield a yellow viscous mass, which was loaded over a flash column of silica gel using different solvents of increasing polarity, viz. petroleum ether, benzene, ethyl acetate and methanol respectively.

From petroleum ether, petroleum ether-benzene (8 : 2, v/v) and chloroform-methanol (8 : 2, v/v) fractions compounds A (100 mg), B (100 mg) and C (80 mg) respectively were isolated. Compound-A, [M^+ 428], m.p. 225° (Found : C, 84.0 ; H, 11.9. $C_{30}H_{52}O$ calcd. for : C, 84.1 ; H, 12.1%) gave positive colour test for pentacyclic triterpene[1]. Its ir spectrum showed the presence of a hydroxyl group at 3 410 cm^{-1}. It gave a monoacetate on acetylation in refluxing pyridine. Its ^1H nmr spectrum was consistent with hopane derivative bearing an hydroxyisopropyl side-chain, and mass spectrum confirmed the position of attachment of hydroxyisopropyl function at C-22 of hopane moiety (*m/z* 369 and 59). Hence compound-A has been identified as hopane-22-ol.

Compound-B, $C_{30}H_{50}O_4$ [M^+ 474] m.p. 291° (EtOAc) (Found : C, 72.5 ; H, 10.2. $C_{30}H_{50}O_4$ calcd. for : C, 75.9 ; H, 10.5%) gave colour reactions of pentacyclic triterpenoids. Its ir spectrum showed absorption for hydroxy group at 3 450 cm^{-1}. ^1H nmr spectrum showed signals which are characteristics of oleanane skeleton[2] indicating the presence of pentacyclic triterpenoid system of β-amyrin type which was also supported by colour reactions[3], and mass spectrum revealed a pair of diagnostically important peaks[4] at *m/z* 207 and 189 (207-H_2O) as observed in olean-12-en derivatives containing a hydroxyl function in ring A or B. Hence compound-B is characterised as 3α,21α,22β-trihydroxy-17-hydroxymethyl-oleanane-12-ene. In conformity with this structure it formed a tetraacetate with acetic anhydride and pyridine, $C_{38}H_{56}O_8$ [M^+ 642], m.p. 224° *m/z* 582, 480, 332, 256, 230, which gave expected ir and ^1H nmr spectra.

Compound-C, [M^+ 218], m.p. 168°, *m/z* 203, 189, 162, 121 and 91 (Found : C, 82.21 ; H, 10.0. $C_{15}H_{22}O$ calcd. for : C, 82.5 ; H, 10.09%) was characterised as a bicyclic sesquiterpenoid containing a formyl group conjugated with a trisubstituted bond from its uv and ir spectra. From extensive ^1H nmr analysis the compound-C is established[7] as isobicyclogermacren-14-al.

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