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NOTES

Chemical Constituents from the Fruits of *Cotoneaster microphylla* Wall ex Lindl

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The fruits of *Cotoneaster microphylla* have been studied for its chemical analysis and found to consist of betulinic acid, ursolic acid and 1:4:3:6-dianhydro-D-mannitol.

The genus *Cotoneaster*, (Family Rosaceae) has 15 species of which 11 species occur in Kumaun Himalaya. *C. microphylla* is an evergreen shrub. Flowers are white in colour. Fruits are bright red. The stolons are used as astringent in Indo-China[1]. The leaves contain sorbitol and a cyanogenetic glucoside psulaurasin, the young twigs contain sorbitol and hydrocyanic acid. The plant is used as an astringent[2]. The fruits of *C. microphylla* from an important diet of hilly people and are eaten raw and they are a good source of vitamins and minerals for them[3]. The present communication reports the study of ripe fruits collected from Naina Peak area, Nainital in the month of November 1988.

The air-dried, powdered fruits of *Cotoneaster microphylla* were extracted in a soxhlet apparatus with 90% ethanol. The ethanolic extract was cooled, filtered and concentrated under vacuum pressure. The ethanolic concentrate (18 g) was adsorbed on silica gel (80 g) column and eluted with various solvents starting from non-polar to polar one. Column on eluting with petroleum ether: benzene (50:50, v/v) yielded compound A, with benzene: chloroform (95:5, v/v) compound B and with pure ethyl acetate, compound C was isolated. These compounds were further characterised on the basis of chemical tests[4] and spectral data.

Compound A was recrystallized from methanol as white shining crystals, m.p. 310°C which responded to Leibermann Burchardt test for triterpenes. The IR (KBr pellet) ν_{max} (cm^{-1}) spectrum revealed characteristic peaks at 3350 broad (O–H), 1700 (>C=O, acid), 1250 (C—O), 885 cm^{-1} (exomethylene). ^1H NMR spectrum showed $\delta(CDCl_3)$ 0.6–1.01 (15H, 5 × methyl), 1.67 (3H, vinylic methyl), 3.19 (1H, H-3), 4.8 (2H, exomethylene protons). The mass spectrum revealed m/e 456 (M^+), 189 (base peak), 437, 422, 410, 409, 394, 300, 246, 232 and 208. With the help of these results compound A was identified as betulinic acid which was further confirmed by Co-TLC and mixed melting point with authentic sample.

Compound B recrystallised from absolute alcohol m.p. 290°C gave positive

test for triterpenes, ν_{max} (cm^{-1}) (KBr) 3400 (OH), 3000–2900 (C—H str), 1700 (>C=O, acid), 1470–1380 (CH_2 def), 1250 (C—O), 830 cm^{-1} (trisubstituted C=C). ^1H NMR ($CDCl_3$) δ0.65–1.06 (21H, 7 × CH_3), 3.0 (IH, H-3), 5.10 (IH) Olefinic proton, m/e 456 (M^+), 203 (Base peak), 438, 302, 301, 300, 248 and 133. Hence compound B was identified as ursolic acid which was further confirmed by CC-TLC, mixed melting point with authentic sample and by preparing its derivative (methyl ester, m.p. 192°C).

Compound C was recrystallised from methanol, m.p. 86–90°C soluble in alcohol and water but insoluble in ether, the colour reactions indicated sugar alcoholic nature (ceric ammonium nitrate-red, ammonium $CuSO_4$-blue ppt., anisaldehyde-sulphuric acid-blue spots on TLC). The spectral data ν_{max} (cm^{-1}) (KBr) 3600-broad (O—H), 3000–2950 (C—H, str), 1420, 781 (CH_2 def.) 1100, 910 781 cm^{-1} (cyclic ether). ^1H NMR (DMSO-d_6) δ3.6 (2H, H-3 and H-4), 4.1 (2H, H-2 and H-5), 4.5 (OH), 3.4 (4H, H-1 and H-6), m/e 146 (M^+), 61 (base peak), 115, 104, 103, 91, 74, 73 and 56. The chemical and spectral data indicated compound C as 1:4:3:6 dianhydro-D-mannitol, which was confirmed by preparing its benzoyl derivative, m.p. 132°C.

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