

Acknowledgement

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Preliminary Investigation on the Structure of *Woodfordia fruticosa* Gum

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THE stem of the plant *Woodfordia fruticosa* (Linn.) Kurz. Syn. *Woodfordia floribunda* Salisb. (Fam. *Lythraceae*), when broken exudes a pale yellow gum locally called as 'Dhau Gum'. It finds extensive application¹ in textile printing as it can protect parts of fabric which can not be coloured during the process of dying. Since *Woodfordia fruticosa* gum has remained uninvestigated so far, the present work has been undertaken to isolate the gum polysaccharide in an homogeneous state for elucidation of its structure.

Crude gum was obtained as a flocculant white precipitate by treating an aqueous, acidified solution of the commercial product with large excess of ethanol. Repeated fractional precipitation followed by treatment with cation and anion exchange resins yielded the pure

polysaccharide in the form of white powder m.p. 223-25°(dec.), $(\alpha)_D^{20} = +40.69^\circ$, (Ash, 0.34 per cent). Upon paper electrophoresis it migrated as a single spot ($\mu = 0.034 \times 10^{-6}$ cm², sec⁻¹, volt⁻¹) thereby establishing the homogeneity of the sample. Pure gum is non-reducing in nature and is free from nitrogen, sulphur, halogen and methoxyl. It gave on analysis Furfural, 11.46; Pentoses, 22.55; Anhydrouronic acid, 10.75 percent and Eq. wt. (by titration) 2177. Acetylation² of the polysaccharide furnished a crystalline acetyl derivative m.p. 170-172° (-OAc, 45.53 percent).

Complete acid hydrolysis of the pure gum with sulphuric acid (2*N*) for 40 hrs. on a steam bath produced a mixture of neutral sugars (A) and barium salt of uronic acid (B) in the form of a brown powder. Paper chromatography of (A) showed the presence of D-galactose, L-arabinose and L-rhamnose (very weak spot). All the three sugars were obtained in a crystalline state by cellulose column chromatography³, and finally identified from their specific rotations and the m.p.s. of their characteristic crystalline derivatives. Quantitative acid hydrolysis of the gum revealed that the two major sugars, D-galactose and L-arabinose, were present in a ratio of 3:1. (B) was identified as D-galacturonic acid from its colour reactions, migration rate and also from its conversion to D-galactose⁴.

Upon graded hydrolysis with dilute sulphuric acid (0.1 *N*) on a steam bath for 9 hrs., the gum yielded a mixture of neutral oligosaccharides (C) and barium salt of poligouronic acids besides galactose and arabinose. Chromatography of (C) on a charcoal-celite column⁵ failed to produce the individual oligosaccharide in a homogeneous state. The mixture of oligosaccharides was finally separated by preparative partition chromatography on Whatman No. 3 mm. paper sheets. The degree of polymerisation of different homogeneous components was estimated according to the method of Peat, Whelan and Roberts⁶. Thus two disaccharides, one trisaccharide, one tetrasaccharide and one pentasaccharide were finally obtained from fraction (C). Their characteristic properties are given in table-1

TABLE 1

Sl. No.	Nature of Oligosaccharides	Recellobiose value in ethyl acetate : acetic acid : butanol : water (4 : 3 : 2 : 2)	Specific rotation $(\alpha)_D^{20}$ in water	Degree of Polymerisation
1.	Disaccharide	1.66	+ 29.89°	1.89
2.	Disaccharide	1.41	+ 31.65°	1.80
3.	Trisaccharide	0.48	+123.35°	3.04
4.	Tetrasaccharide	0.14	+197.16°	4.03
5.	Pentasaccharide	0.04	—	4.85

Further studies on the structure of *Woodfordia fruticosa* gum and in progress.

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Chemical Constituents of *Wrightia coccinea* Sims.

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WRIGHTIA coccinea (Fam. Apocynaceae) on which no systematic chemical investigation was made earlier, is a native of the high altitude Himalayan region. We have been attracted to this plant for the well known medicinal properties of the *Wrightia* species¹. In this communication we report the characterisation of two triterpenes and β -sitosterol along with an unidentified neutral compound isolated from this plant.

Air-dried powdered whole plant (1 kg) was successively extracted with petroleum ether (b.p. 60-80°), chloroform and methanol. The petrol extract on concentration and cooling deposited a solid which on purification by chromatography over silica gel (60-100 mesh) followed by crystallisation from a mixture of methanol and chloroform gave a homogeneous compound (yield 0.5%), $C_{30}H_{50}O_2$ (M^+ 468), m.p. 225°, $[\alpha]_D^{25} + 77^\circ$ ($CHCl_3$). It gave a positive Liebermann-Burchard reaction for a triterpene, and was finally identified with α -O-acetyl- α -amyrin by usual comparison (m.m.p., co-TLC and superimposable IR spectra) with an authentic sample as well as by its conversion to α -amyrin by alkaline hydrolysis.

The mother liquor of the above petrol extract on similar chromatographic resolution afforded β -sitosterol, m.p. 137-38° (acetate, m.p. 127-28°) characterised by comparison with an authentic sample.

The chloroform extract was chromatographed over silica gel and on elution with petrol-ethyl acetate (5:1) afforded a white solid in extremely poor yield (0.0002%), crystallised from methanol to give a compound, $C_{30}H_{50}O_2$ (M^+ 442), m.p. 190-91°, $[\alpha]_D^{25} + 34.5^\circ$ ($CHCl_3$). It does not respond to Liebermann-Burchard reaction for a triterpene or a sterol. Its IR spectrum shows intense absorption at 3320 cm^{-1} for hydroxyl function(s). The signals in the 80 MHz PMR spectrum of the compound in $CDCl_3$ at δ_{ppm} 5.50, 1H, br, signal ($\text{>C=CH-CH}_2\text{-}$); 3.2, 1H, br, signal (-CH-OH); 1.24, 9H, s; 0.90, 6H, s; 0.82, 6H,

s and 0.74, 3H, s (all for -C-CH_3), however, suggest

a triterpenoid nature of the compound having a trisubstituted double bond, a secondary alcohol and presumably a tertiary hydroxyl function. The MS of the compound showing significant peaks at m/e (relative intensity) 442 (M^+ , 9), 425 (18), 424 (53), 409 (39), 302 (39), 255 (20), 203 (51), 187 (26), 175 (37), 173 (23), 163 (20), 161 (33), 159 (20), 149 (29), 147 (46), 145 (21), 135 (46), 134 (23), 133 (39), 123 (27), 121 (60), 119 (40), 109 (86), 107 (64), 105 (40), 95 (86), 93 (56), 91 (30), 81 (69), 79 (34), 71 (22), 69 (70), 67 (38), 55 (83) and 43 (100) provides tangential evidence in support of the above contention. But the fragmentation pattern while showing some characteristic features² of the multiflorene, arborene, Δ^{10} -friedalene and Δ^{12} -lupene group of triterpenoids, does not fully correspond to any one of the above series of compounds. Further work on this compound is being delayed due to inadequate supply of the plant material.

Further elution of the column with petrol-ethyl acetate (4:1) afforded a triterpene acid (crystallised from aqueous ethanol, yield 0.001%). $C_{30}H_{48}O_3$, m.p. 290-1° [Methyl ester, 170°, $[\alpha]_D^{25} + 58^\circ$ ($CHCl_3$); methyl ester acetate, m.p. 245°], identified (m.m.p., co-TLC and IR) in all respects with an authentic sample of ursolic acid. The methanol extract did not give any characterisable compound. It is interesting to note that while *Wrightia* species are well known for elaborating steroidal bases, *W. coccinea* shows total absence of any alkaloid.

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