

THE LIGNANS OF *GMELINA ASIATICA*A. S. R. ANJANEYULU, A. MADHUSUDHANA RAO,
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Our recent examination of *Gmelina arborea* L., revealed a series of novel lignans [1,2] closely related to paulownin. It is now extended to *G. asiatica* L., a large and much branched shrub with a light pinkish red heartwood. This plant has apparently not been examined chemically except for its seed oil [3].

After exhausting the powdered heartwood with *n*-hexane, the methanolic extract was prepared and separated into crystalline components on silica gel as indicated in Table 1.

Table 1. Compounds isolated from *G. asiatica*

Fraction and compound	Eluent	R_f	Physical characteristics
Neutral fraction			
Methyl <i>p</i> -methoxy-cinnamate	Hexane	0.77*	Colourless needles from hexane mp 90
Sitosterol	Hexane	0.62*	Not pursued further
Paulownin	Hexane: C_6H_6 (4:1)	0.53*	Colourless needles from MeOH mp 105 $[\alpha]_D + 34$ (c 1.0 in $CHCl_3$)
Gmelinol	Hexane: C_6H_6 (1:1)	0.17*	Colourless hexagonal plates from EtOAc: Et_2O mp 124 $[\alpha]_D + 129$ (c 1.0 in $CHCl_3$)
Phenolic fraction			
Methyl- <i>p</i> -hydroxy-cinnamate	C_6H_6	0.68†	Needles from C_6H_6 , mp 137
Cycloolivil	EtOAc	0.56‡	Colourless needles from ethyl acetate mp 167 $[\alpha]_D + 65$ (ethanol)

* C_6H_6 -EtOAc, 9:1.† C_6H_6 .

‡ EtOAc.

All the above compounds were confirmed by comparison with authentic compounds by mmp, IR and in a few cases by NMR also. The tetraacetate of cycloolivil is now described for the first time. mp 150°, $[\alpha]_D + 3.8^\circ$ (c 1.0 in $CHCl_3$), R_f 0.78 (EtOAc). Found: C, 61.7; H, 5.85; $C_{28}H_{32}O_{11}$ requires C, 61.76 and H, 5.88%. NMR ($CDCl_3$): δ 1.16 to 1.42 *m* (2-H), 2.03s (2- CH_2OAc), 2.11s (3- CH_2OAc), 2.23s (7- $OCOCH_3$), 2.31s (4- $OCOCH_3$), 2.73s (3-OH), exchanged by D_2O , 2.86d, 3.26d *J* 17.5 Hz (4- CH_2), 3.81s, 3.86s (3'-6-OMe), and 4.09 d *J* 13 Hz (1-H).

The *Gmelina* species abound with the lignans of the furofuran series. Gmelinol is the major component in all and may be significant for taxonomic purposes. In *Gmelina asiatica*, it occurs along with the corresponding tetralin, cycloolivil. This is the first instance of a tetralin co-occurring with a furofuran and may possess considerable biogenetic significance. Although paulownin has been noted in *G. arborea* and *G. asiatica*, its presence in *G. leichhardtii* requires to be established.

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